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The Organization of the Lumber Industry

With special reference to the influences determining the prices of lumber in the United States

A DISSERTATION
PRESENTED TO THE
FACULTY OF PRINCETON UNIVERSITY
IN CANDIDACY FOR THE DEGREE
OF DOCTOR OF PHILOSOPHY

BY

WILSON COMPTON

PRINCETON:
PRINCETON UNIVERSITY PRESS
1916

Accepted by the Department of History, Politics
and Economics, June 1915.

PRINCETON
UNIVERSITY
PRESS

THE ORGANIZATION OF THE LUMBER INDUSTRY

WITH SPECIAL REFERENCE TO THE INFLUENCES DETERMINING THE PRICES OF LUMBER IN THE UNITED STATES

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CHICAGO
AMERICAN LUMBERMAN
1916

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431 South Dearborn Street, Chicago

Curtis-Johnson Printing Company
Chicago, Illinois

PREFACE.

The solution of many of the economic problems associated with the conservation of natural resources is intimately connected with the analysis of *prices*. This conception has led to the presentation of a study of the influences which have largely determined the recent course and the present level of the prices of lumber in the United States. Of the necessary incompleteness of the analysis, the writer is aware. It is hoped, however, that the appraisal of the price-determinants may be found to have sufficient foundation in fact, to warrant its acceptance by those who are interested in the lumber industry, its history and its organization in the United States.

The method of price study employed is a novel one. But the character of the source material to which the writer has had access has left open no other practicable way. For the peculiar nature of these statistics the organization of the lumber industry is largely responsible. Had the writer been able to avoid the almost exclusive use of *relative* prices, he would have been spared much of the laborious effort that has been devoted to the diagrams, tables and appendices. It is confidently hoped, however, that the initial inconvenience due to the method of treatment may be compensated by the resultant greater completeness and accuracy of the evidence.

Acknowledgment is made of special indebtedness to the Department of Commerce of the United States and to the Forest Service and the Bureau of Labor Statistics. Their libraries and files have been generously placed at the disposal of the writer in the preparation of this monograph. Grateful acknowledgment is rendered also to the National Lumber Manufacturers' Association; to its affiliated associations and to the many individual lumber manufacturers who have assisted with much useful information. Special mention is made of the American Lumberman. Because of its long identification, through its predecessors, with the lumber industry and because of the representative character of its interests throughout the United States, the American Lumberman has been a useful source to which the writer has had frequent resort.

Of his indebtedness to Professors Frank A. Fetter, E. W. Kemmerer and W. M. Adriance of Princeton University, the writer wishes to record the grateful acknowledgment. Without their constant encouragement and advice this monograph would have lacked much of whatever merit the student of the lumber industry may now find in it.

Wilson Compton.

Hanover, New Hampshire, January, 1916.

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Key: To facilitate the citation of sources reference to the trade literature, throughout the present study, has been made as follows:

American Lumberman	Cited as:
St. Louis Lumberman	A. L.
New Orleans Lumber Trade Journal	St. L. L.
Mississippi Valley Lumberman	N. O. L. T. J.
New York Lumber Trade Journal	M. V. L.
West Coast Lumberman	N. Y. L. T. J.
Pacific Coast Lumber Trade Journal	W. C. L.
Northwestern Lumberman	P. C. L. T. J.
Southern Lumberman	N. L.
Hardwood Record	S. L.
The Timberman	Hardwood Record
	The Timberman

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CHAPTER I.

INTRODUCTION.

The present study is concerned with the special influences which have determined the prices of lumber in the United States. Only wholesale prices have been used. These have been defined as the prices at which sales are actually made on the usual terms to the retailer or to the purchaser of lumber in large quantities. They represent that stage in distribution, nearest to the prices paid by the ultimate consumer, at which, as between sources of production and as between markets, there has been substantial uniformity in grading and in nomenclature.[1] Terms of sale and grading practice, indeed, have often varied greatly among retailers in the same market. Loosely defined rules for grading and for inspection had been recognized by many manufacturers of lumber before 1890. Not however until the organization, throughout the country, of manufacturers' associations has approximate uniformity been established. The resultant minute classifications have since then aggregated hundreds of different items.[2]

Relative Lumber Prices: Scope of Study.

The substantial elimination of confusion in grading has not, however, made it practicable to project back the identification of similar grades and items into the period before about 1890. An accurate analysis of *actual* prices would have required the establishment of such identity. In this study, therefore, almost exclusive use has been made of *relative* prices and of index numbers on a selected base. A number of successive series of prices, each overlapping for not less than three years, the immediately succeeding series, have been reduced to a single series on a common base price. For example, the series of lumber prices (See Appendix II., III.) for the period 1886 to 1897 overlaps, for the three years, 1896 to 1898, the succeeding series for the period 1897 to 1910. Inaccuracies due to changes in grading have been thus reduced to a minimum.

---

[1] Lack of uniformity in grading was until recent years a conspicuous defect in all branches of the lumber industry. The recent efforts of associations of manufacturers to promote the "standardization of product" have met with reasonable success among the producers of softwood lumber. Hardwood grading is still divergent. Grades may be identified in general as follows:

Grade: 1st clear; width 6 in.; defects allowed, none.

Grade: 2nd clear; width, 6 in.; defects allowed, bright sap, small knots.

Grade: 3rd clear; width 4 in.; defects allowed, same; larger knots.

Grade: Selects, width, 4 in.; defects allowed, 60 per cent clear of knots, rot or shake.

Grade: Shop—large or loose knots; 2 ft. to 6 ft. clear lumber between knots.

Grade: Wide common (No. 1), 12 in.; defects allowed, blue sap, large knots, tight shake, wane; no rot.

Grade: No. 2 common, 4 in.; defects allowed, same.

Grade: No. 3 common; defects allowed, very coarse knots, wane, discoloration.

Grade: Culls; defects allowed, red rot, loose shake, knots, check, wane.

Dimension lumber: No. 1 sound, square-edged, tight round knots; No. 2 sound, wane, long coarse knots, worm holes; culls, wane, shake, rot, imperfect manufacture; mill run, the average grade of the current product, varies from mill to mill and from year to year. Thickness is usually not specified in the grading rules; N. O. L. T. J., Feb. 15, 1899, p. 13; A. L., Sept. 3, 1904, p. 26.

Classification of dressed lumber: S1S or D1S, surfaced, dressed or planed on one side; S2S, same, on two sides; S1S1E, surfaced on one side and one edge; D & M, dressed and matched; D & H, dressed and headed. Lumber is usually sawed in even widths and lengths and classified from clear to common. The above general rules have been abstracted from the standard rules of the various lumber manufacturers' associations (See infra., pp. 51-57); from the New York Lumber Trade Journal and from the publications of the Lumbermen's Bureau (Inc.), Washington, D. C.

[2] E. g., Standard List B, issued by Pacific Lumber Trade Journal, Seattle, 1913, pp. 3-21, shows nearly 400 items.

It is the purpose of this study to explain the changes in the prices of lumber shown by the following diagram.[3] To explain the direction and the extent of the variations in *lumber* prices from the prices of "all commodities" (the gold dollar being the standard unit of price), is the task of the following chapters. The year 1880, selected as the base year in Diagram 1 may be fairly taken as marking the first appearance of indications of substantial exhaustion of the white pine supply in Michigan.[4] During the year 1880 nearly one-fourth (23.4 per cent) of the total lumber output of the United States was produced in the State of Michigan alone. There has since been an almost unbroken *relative* rise in lumber prices as compared with general prices, the only notable exception having occurred after the panic of 1907. The base line denotes "all commodities" which, for each successive year, is taken as 100. The index numbers below the base line show the course of the prices of "all commodities" with the prices for 1880 taken as the base, 100. Assuming therefore that general prices, i. e., the prices of "all commodities," have remained constant at 100 (the base line), the curve in Diagram 1 shows the movement of lumber prices *in so far as it has differed from the movement of general prices.*

Price Influences Peculiar to Lumber.

The quantitative isolation of effects due to a specific cause from the total effect due to a multiplicity of co-operating causes has been impracticable. The necessary data are at present not available. The tendency to higher prices caused by the recent relative increase in the quantity of money is assumed to have been a general influence tending to affect in the same direction, the prices of all commodities.[5] Unless, therefore, the changes in the purchasing power of money have had more than an average actual effect[6] upon lumber prices—and there has been no evidence that this is the case—they do not constitute, in any real sense, an influence *peculiar* in its effect upon lumber prices. In order to isolate causes peculiarly operative in the lumber industry, it has been necessary to determine the extent to which general causes have been responsible for historical lumber price phenomena. It is the purpose of this chapter to

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[3] The index of prices of "all commodities" has been adapted from Bureau of Labor Statistics, Bull. 149, Wholesale Prices, 1913, p. 179; that of lumber prices from Appendix II. See also Diagram 12, p. 82.

[4] Annual Review of the Manufacture of Lumber and Salt in the Saginaw District, E. Cowles, ed., 1881, p. 3.

[5] Kemmerer, E. W., Money and Credit Instruments in their Relation to General Prices, 2d ed., 1909, pp. 141, 142.

[6] Cairnes, J. E., Essays, pp. 64, 65.

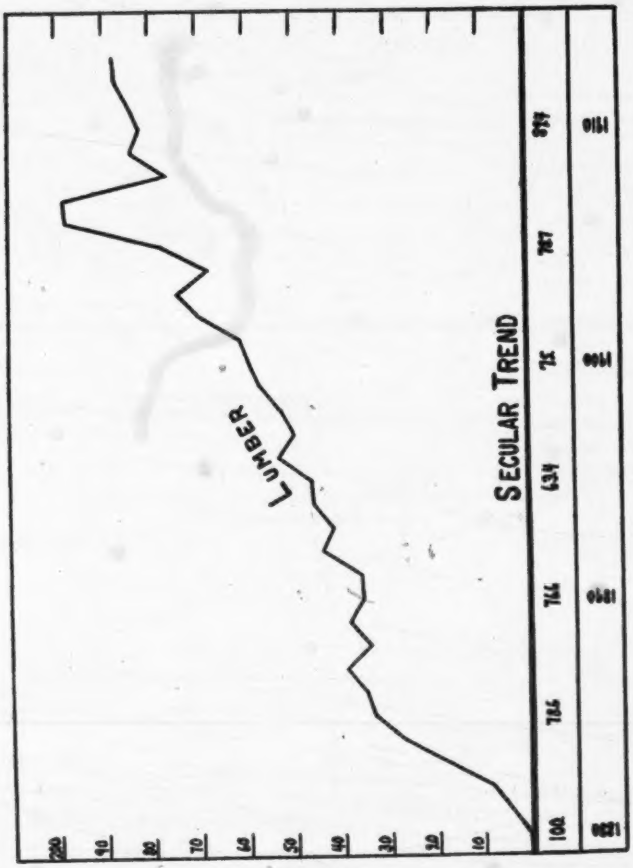

DIAGRAM 1.
Comparison of Lumber Prices with General Prices, 1880 to 1913.

Note: The secular trend is the course of general prices over a period of years.

define the scope of the present study; to distinguish those influences which have been important from those which have not; and to estimate briefly the effect of selected minor influences in the chronology of lumber prices in the United States.

Characteristics of Lumber Industry: Production.

One of the distinctive characteristics of lumber manufacture is the nature of its relation to the supply of raw material, i. e., logs. The amount of standing timber, unlike other "natural resources" (which are also capable of exhaustion), is definitely ascertainable.[7] It is a known quantity incapable of increase except by a growth which is itself measurable.[8] The bulk of it in the United States has become relatively inaccessible to the centers of population. This has been a result of the depletion of original forests in the older, more densely populated regions. The great size and weight of lumber in proportion to its value has, for economy in transportation, caused the concentration of lumber manufacture in the forests themselves.

Sawmills therefore use as raw material a natural product the total supply of which is known, inconvenient of transportation and originating in sources nearby. Mills have been located with reference to cheap log supply rather than to convenience in marketing their product.[9] The steadily increasing relative exhaustion of the raw material of lumber manufacture is attested by the fact that one-half of the original stand of merchantable virgin timber in continental United States has been consumed (1909), and that the present rate of total annual growth is about one-third of that of the annual cut.[10]

"COST OF PRODUCTION."

The "cost of production" of logs, as calculated by lumber manufacturers, has been merely a harvesting cost, i. e., the expense of logging and of delivery from the stump to the mill. Generally speaking, there has been no industry in the United States devoted to the growing of timber of merchantable quality.[11] The total available physical supply of timber during any period has therefore been relatively constant. It cannot be increased in response to current increases in demand nor can it be diminished in the face of a decline in the demand. The effective supply on the other hand, i. e., that part which is at any time actually offered for sale, is capable of sensitive adjustment to current demand.

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[7] See infra., p. 60, for estimate of standing timber.

[8] Maw, P. T., The Practice of Forestry; concerning also the Financial Aspect of Afforestation, 1909, pp. 272, 273; also Schlich, Sir Wm., Manual of Forestry, Vol. III, Forest Management, 1911, pp. 68, 91.

[9] Washington's Secondary Wood-Using Industries, p. 1; in P. L. T. J., Nov., 1911; Wood-Using Industries of New York, 1913, pp. 7, 8.

[10] The Timber Supply of the United States, For. Ser. Circ. 166, 1909, p. 6.

[11] There have been many attempts, on a small scale, to encourage timber growing. State and federal activity has been the most successful. Lumber manufacture, however, has been concerned almost exclusively with virgin timber or with strictly natural regrowth. Wood-Using Industries of Ohio, 1912, pp. 12, 13; Kellogg, R. S., and Ziegler, E. A., The Cost of Growing Timber, 1911, p. 4.

When timber was plentiful throughout the country, the demand for it was slack. Tree growth was often considered to be an encumbrance to the soil which alone was thought to have potential value.[12] Willing sellers of timber were many; willing buyers few. As convenient supplies, however, became scarcer, timberlands as such began to acquire value for investment.

Beginning with the decline of the lumber industry in the Eastern States[13] standing timber, first in the Lake States region, later in the southern pine states and since the early nineties in the Pacific Northwest,[14] has been concentrated in private holding to a degree which offers a serious potential challenge to future public policy.[15] The expropriation from the public domain in these three regions of more than three-fourths of the remaining stumpage,[16] has caused a great change in the conditions of supply of raw material to the lumber manufacturer who does not own his own timber. Physically accessible supply and *effective* supply of timber are now by no means co-extensive.

Since stumpage has acquired an appreciable value in all forested regions, it is frequently held for higher prices. Encouraged by the almost uninterrupted rise in stumpage prices following the extension of commerce in lumber beyond the limits of local trade, timber owners have come to believe that prices tend always to rise; never to fall.[17] When, therefore, the current demand has declined, timber has been withdrawn from sale, the owner preferring to await an anticipated improvement[18] in the market rather than to sell at a lower price. Thus stumpage price levels once reached, have tended on the average to be maintained by financially strong holders, i. e., holders who have been able to pay all carrying charges without resort to the immediate current sale of timber. The stronger therefore the average financial strength of timber ownership, the less responsive have been stumpage prices to any immediate decline in the prices of lumber. Although the physical supply during any period has been approximately constant, an adjustment of supply to demand under conditions of a lower price for lumber, has been secured by a decrease in the effective supply, i. e., in the quantity of timber offered for sale.

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[12] Wood-Using Industries of Ohio, p. 9.

[13] See infra., pp. 28, 29, Diagrams 5 and 6.

[14] In these three regions stand over 80 per cent of the remaining supply of stumpage.

[15] The Lumber Industry, Pt. II., Concentration of Timber Ownership in Important Selected Regions, 1914, p. xix.

[16] The United States owns about 550 billion feet in the National Forests or about one-fourth. The privately owned timber is, however, of a higher average quality. The Status of Forestry in the United States, For. Ser. Circ. 167, 1909, pp. 3, 5.

[17] A. L., Nov. 12, 1910, p. 79; The Lumber Industry, Pt. I, p. 39.

[18] Kellogg, R. S., and Ziegler, E. A., op. cit., pp. 4, 5. The fact is important to note, that the majority of timber owners are also manufacturers of lumber. Moreover, most of the current lumber output has been produced by manufacturers owning their own timber. Although disguised under the dual function discharged by the same person, the *principle* stated has been nevertheless operative. Many producers, however, because of inaccurate or incomplete accounting, have been unable to determine the cost to themselves as manufacturers of the timber they have cut. St. L. L., Nov. 1, 1914, p. 59; also Business and Lumber Trade Conditions (Barnes, W. E., ed.), No. 33, Nov. 18, 1914, pp. 1-3.

Many producers also whose enterprises have been heavily bonded, have been compelled to manufacture lumber for current sale at whatever prices then prevailed, in order to meet accruing obligations. The result of such a condition is illustrated in the practice among many southern operators of heavy shipping "on consignment" to northern markets after the great decline in prices during 1907 and 1908. This overstocking of the market contributed to a still greater decline in lumber prices.

TAXATION OF TIMBER.

One of the most potent limitations to the with-holding of timber from sale is the influence of the taxation of such property. An insistent public problem is here involved in the inequality of administration and in the inadequacy of the general property tax as applied to property in timber.[19] A study of forest taxation in forty states[20] in 1914 has shown that "classification" for a tax on yield is favored in many states where timber is an important item of the taxable property; that by others it is favored in theory but feared in practice, as too greatly curtailing current receipts from taxation. In nearly all states classification of property is at present forbidden by the respective state constitutions. The evidence collected and the opinions secured on this subject have shown:[20a]

First, that lumber prices have been affected by timber taxation, if at all, only through its effect upon the holding, and conversely upon the cutting, of timber.

Second, that taxation has tended to encourage the rapid cutting of timber,

(a) where assessment rates are high and where the law is strictly administered; or

(b) where the annual increase in the value of the timber has not been in considerable excess of the annual taxes levied upon it.[21]

Third, that taxation in many states has not prevented the withholding of timber from present use in favor of an anticipated rise in value,

(a) where timber is assessed at a low rate or the administration of the tax is loose; or

---

[19] "Economists have for years recognized the fact that the burden to which such [timber] lands are subject under present tax systems is very unjust." The Status of Forestry in the United States, For. Ser. Circ. 167, p. 18.

[20] A questionnaire concerning the taxation of timber was submitted by the present writer to the tax commission of each state. The majority of the forty responses included replies to the inquiries concerning the effect: (1) upon the holding of timber; and (2) upon lumber prices in the respective states, of the taxation of timber. The responses indicate some familiarity with the propaganda fostered by the International Tax Association in 1907 and 1908 at its conferences at Columbus, Ohio, and at Toronto, Canada, respectively.

[20a] See Compton, Wilson, Recent Tendencies in the Reform of Forest Taxation; in the Journal of Political Economy, Vol. XXIII, No. 10, Dec., 1915, pp. 971 to 979.

[21] Some of the replies did not explain the requirement of the "considerable excess." It is presumed to cover the annual accumulations of interest upon the investment or rather, perhaps, upon the estimated capital value of the stand. It is apparent that when the proportionate annual increase in the value of the timber no longer exceeds the annual accumulations of carrying charges, of whatever kind they may be, the net advantage to the timber owner will be in immediate cutting rather than in holding for still greater future stumpage prices. The approach to this condition in many states presents a public problem of importance.

(b) where the current increase in stumpage value has greatly
exceeded the tax. This phenomenon has appeared most con-
ously in the Pacific Northwest where have occurred recently the
est proportionate increases in stumpage prices and where also there
een the greatest tendency toward speculative timber holding.[22] Tim-
nds there, as in many regions of the South, have constituted a large
ortion of the wealth of the states.

Characteristics of the Lumber Industry: Distribution.

FOREIGN TRADE IN LUMBER.

About ninety-seven per cent of the domestic production of lumber
een consumed within the United States.[23] The exports have con-
l chiefly of high grade lumber of selected species which have acquired
rket in all parts of the world.[24] For the period 1880 to 1909 imports
exports approximately counterbalanced each other. Since 1909
has been a rapid increase in exportation while the importation of
er has remained practically constant, as is shown in Diagram 2. Of
otal quantity of lumber now consumed in the United States about
per cent is imported.[25]

Lumber prices in the United States have been influenced by the
rtation of lumber only in so far as such importation has affected
supply. Imported lumber has not, however, supplied a demand
h otherwise would have remained unsatisfied.[26] There is no indica-
that the amount of lumber consumed has risen or fallen with corre-
ding fluctuations in the imports. The only markets appreciably
ted by importation have been those to which Canadian lumber[27] has
convenient access, i. e., those of the Northwestern States and of the
ic Northwest. In the aggregate, however, foreign lumber has exer-
only an inconsiderable influence upon conditions of lumber supply
e United States. As an independent influence, therefore, it has been
portant.

E. g., the Weyerhaeuser Timber Company is the second largest timber owner
United States. It saws no lumber in its own name. A subsidiary, however,
/eyerhaeuser Lumber Company, operates a large mill. The Lumber Industry,
, pp. 4, 9.

Percentage: Exports, of total production, 1880, 1.5; 1890, 2.6; 1899, 2.9;
3. Since 1909 exports have almost doubled; average since 1880, 2.6 per cent.

See American Lumber in Foreign Markets, Special Consular Reports, Vol.
894, pp. 5-217.

Percentage: Imports, of total domestic consumption, 1880, 3; 1890, 5; 1899,
909, 1.9. Imports have remained practically constant since 1900; average since
2.9 per cent.

It is to be remembered that the quantity of lumber imported is not a
ure of the relative influence of importation upon prices. If importation should
entirely domestic production might be increased or a part of the lumber
ally exported might be absorbed by the home market.

Practically all importations of lumber have been from Canada. Exports and
rts of Forest Products, 1907, For. Ser. Circ. 153, p. 24. Lumber imported from
sources than British North America have consisted almost wholly of high
l cabinet and finishing woods. Imports of Farm and Forest Products, Dept.
gric. Bur. of Statistics, Bull. 95, 1912, p. 78.

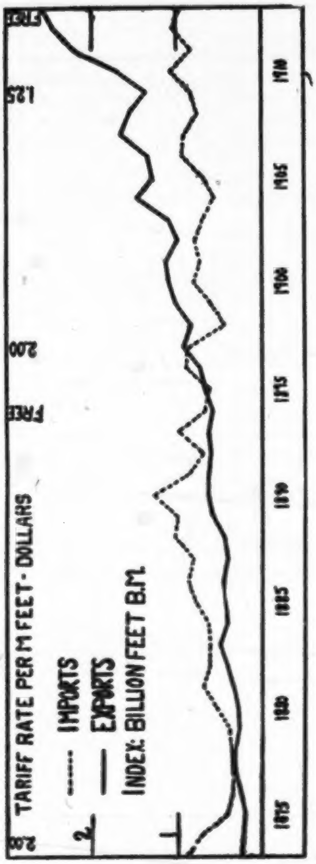

DIAGRAM 2.
Imports and Exports of Lumber, 1873 to 1913.

THE TARIFF ON LUMBER.

Since the lumber industry has been almost exclusively a domestic ndustry, changes in the tariff schedule on lumber have not been the ause of any considerable corresponding changes in lumber prices. Low ates have not been uniformly followed by an increase in importation, ıor higher rates by a decrease (See Diagram 2). The importance to he lumber industry of a protective tariff has been often overestimated.[28] ndividual border mills and markets have been undoubtedly affected ad-ersely by a reduction in the lumber tariff. The effect, however, upon he industry of the admission, since 1913, of "free lumber" is generally onsidered, even by manufacturers who meet Canadian competition, to ave been negligible.[29] Among the lumbermen themselves there has been ıo unanimity of opinion as to the influence of the lumber tariff. The revalent sentiment seems to have been that so little protection has been fforded under it that its retention or its removal is of little conse-uence.[29a] West Coast lumber manufacturers have long competed suc-essfully in foreign markets with Canadian mills. They have even undersold the Canadian producer in many Canadian markets to which they have ad convenient access.[30]

TRANSPORTATION OF LUMBER.

The farther the sources of lumber production have receded from the centers of consumption, the greater has been the proportion of the delivered price which is absorbed by transportation costs. Such costs were relatively unimportant as long as lumber travelled only short distances to market or where cheap water transportation was accessible. Today, lumber constitutes the largest single item of railway tonnage[31] in the Pacific Northwest, while in the South it is exceeded only by coal.

> "The shifting of the source of the lumber supply has prevented the lumber [freight] rate structure from ever attaining a condition even approaching stable equilibrium."[32]

During the period in which the Lake States were the chief source of supply,[33] transportation to market was mainly by water, especially by the Great Lakes and by the Mississippi River.[34] The subsequent shift to the South and finally to the Pacific Northwest has involved almost complete dependence upon the railroads for the transportation of lumber to the interior markets. Cargo shipments are still maintained to eastern ports from South Atlantic and Gulf States mills which have cheap access to tidewater. Coastwise trade by many of the West Coast mills is still of considerable proportion, although the total quantity so consigned to domestic ports is relatively unimportant.

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[28] An examination of all the tariff hearings by Congress since 1884 shows that then as now there has been, among the lumbermen themselves, no unanimity of opinion as to the influence of the lumber tariff. In a recent interview (March, 1914) a former Michigan white pine manufacturer expressed the opinion that the only states affected at all have been the border states and that nowhere have relatively high rates been the cause of prosperity nor low rates (or free admission) of disaster to any large number of mills.

[29] Special Report on Present and Past Conditions in the Lumber and Shingle Industry in the State of Washington, 1914, Bur. of Corp., 1914, pp. 8, 41.

[29a] Official Report, Tenth Annual Convention, National Lumber Manufacturers' Association, 1912, pp. 40, 41.

[30] Ibid., pp. 7, 41, 42.

[31] Johnson, E. R., and Huebner, G. G., Railroad Traffic and Rates, 1911, Vol. I, p. 40.

[32] McPherson, L. H., Railroad Freight Rates, 1909, p. 133. Lumber rates are "commodity" or "ex-class" rates and are quoted on the 100 pounds. A thousand feet of dry lumber weighs between 2 and 3 thousand pounds, according to species.

[33] See infra., Diagram 5, p. 28.

Encouragement of lumber industry by the railroads. The lumber carrying railroads of the interior northern region continued to foster the declining white pine industry of the Lake States. They made relatively lower rates to competitive markets on white pine lumber than on southern pine. They encouraged the development of agriculture on lands denuded of forests and justified their discrimination against the southern pine manufacturer on the grounds that there was no southbound traffic for the cars that brought the yellow pine to northern markets. With the depletion of the northern forests, however, the rates on southern pine have been reduced.

While the northern railroads were thus discriminating in favor of the white pine mills, the railroads newly constructed in the South and in the Southwest were attempting to stimulate commerce in southern lumber. By successive reductions in the rates applying on northern shipments the railroads secured for yellow pine a standing in the northern, central and middle-western markets. As the production of white pine further declined, the control of supply to interior consuming territory, by the southern mills, became almost complete. The shift, therefore, from one source of supply to another has been either artificially stimulated or retarded by the action of the railroads.

Rate increases. One of the most vigorously contested issues between the railroads and the public has been whether the carriers shall share in the business profits of their patrons. On this question the opinion of the Interstate Commerce Commission has been divided. For example, the southern railroads, having long fostered the lumber industry in the South, frequently attempted to raise their rates on shipments to northern markets. They claimed the right to share in the prosperity which they themselves had helped to create. The lumbermen contested the advances and were upheld by the Interstate Commerce Commission and by the courts, on appeal. The advances were nullified on the ground of unreasonableness per se; that the former rates were sufficiently remunerative to the carriers and that the attempted advance constituted an unjust discrimination against the lumber industry.[35]

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[34] During the period of cargo shipments of white pine the general custom was to load indiscriminately, various sizes and grades. The assortment of items and grades was made at the different distributing markets. Only three merchantable grades were distinguished at the mills, i. e., shipping culls, common and uppers. At present the practice is almost universal among mills manufacturing softwood lumber, to load at the mill the exact sizes, shapes and grades specified in the orders, on cars that go to the purchaser direct, without intermediate handling. The primary methods of distributing lumber; in Ann. Rev. of the Manufacture of Lumber and Salt in the Saginaw Dist., 1882, p. 8; also McPherson, L. H., op. cit., pp. 134, 135.

Transcontinental rates. This issue is again illustrated in the history of the transcontinental lumber rates. Until 1894 the West Coast lumber industry had been but little developed. It had depended upon water transportation for the extension of commerce beyond local markets. The establishment in 1894 by the Hill roads of a 40-cent rate on lumber to Minneapolis[36] and of a 50-cent rate to Chicago is an excellent example of a deliberate attempt to encourage traffic which was at the same time of low grade, of long distance and competitive. There had been much medium and low grade West Coast lumber unable to bear the former transportation costs. What of this was not consumed locally or in markets accessible by water was, therefore, a practical waste. Since there was then a normal eastbound movement of "empties" the new rates were fixed by the carriers to a little more than cover the additional cost incurred in the hauling of loaded cars in place of "empties," i. e., according to the "value of the service."[37] An enormous lumber traffic has been built up. A new check, actual or potential, has been thereby imposed upon the prices to which competing lumber in the same markets, from other sources, may rise. Lumber has since become the largest single item of transcontinental traffic.

The price of West Coast lumber increased rapidly after the extension of its market. Its chief species, Douglas fir, by 1907 had risen in average price more than 100 per cent.[38] Meanwhile the transcontinental traffic in lumber had so increased under the influence of lower rates that the direction of the empty car movement was reversed from eastward to westward. Thus the "cost of service" to the railroads had increased. The value of the service to the shipper had also increased somewhat inasmuch as the higher average prices had enabled the West Coast lumber to bear a higher rate. As in the South so in the West the carriers considered themselves justified in raising the rates on lumber in order that they might share in the prosperity of an industry they had fostered. An average increase of 10 cents per 100 pounds was therefore announced in November, 1907, coincident with the advent of a general industrial depression.

The price of fir logs, which had increased from $2.50 in 1895 to $13.50 in 1906 (when an excessive and abnormal demand for fir lumber had followed the San Francisco earthquake),[39] declined 30 per cent. Three synchronous causes contributed to this decline. The effect due solely to the increase of rates is therefore difficult to isolate. Industrial depression, higher freight rates and a prolonged car shortage operated coincidently to depress prices. The shortage of cars had prevailed since 1906 and was doubtless the least important of the three causes.[40] The relative fall of fir prices (as representative of West Coast lumber) during 1907 and 1908 was greater than the average decline[41] of general lumber prices throughout the United States. The industrial depression, however, did not affect the western and mid-western lumber market as acutely as it did the market in the Eastern and Central States.[42] A part of the drop in fir prices must therefore be attributed to other causes. It is probable that the rate increases, together with the uncertainty among shippers and buyers as to the fate of the increases then before the Interstate Commerce Commission for approval, were the principal contributory causes.[43]

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[35] H. H. Tift et al. v. Southern Railway et al. 10 I. C. C. Rep. 548, 582; 138 Fed. Rep. 753; also Central Yellow Pine Association v. Illinois Central Railway, 10 I. C. C. 489, 505, 536; 206 U. S. 428; decided May, 1907; also I. C. R. Co. v. I. C. C., 209 U. S. 441.

[36] This rate was blanketed for several hundred miles west of Minneapolis.

[37] Dunn, S. O., The American Transportation Question, 1912, pp. 30, 31.

[38] See infra., Diagram 13, p. 85.

[39] Within eight months after the earthquake the average price of fir building lumber had increased nine dollars per M feet. W. C. L., Jan. 1, 1907, p. 264.

Increases annulled. The new rates were contested by the lumbermen before the Interstate Commerce Commission. The problem involved concerned the obligation of the railroad, having once by low rates induced investment in the lumber industry, to continue the rates upon which the industry had been developed.[44] The manufacturers claimed that the increase in profits belonged solely to the industry. The railroads defended the increase on three grounds:[45]

First, the increase in the price of lumber.

Second, the increase in the cost of railway operation.

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[40] For several months ending in April 1907 there had been a virtual embargo on transcontinental lumber shipments by the Northern Pacific and the Great Northern Railroads.

[41] See infra., Diagram 13, p. 85.

[42] A. L., Sept. 26, 1908, p. 39.

A reasonable index of the comparative effects of the depression may be derived from the statistics of wooden buildings erected during 1906, 1907 and 1908. In the region west of the Mississippi River supplied wholly or in part by West Coast lumber, such building decreased 7 per cent in 1907 as compared with 1906; it increased in 1908, 12.5 per cent as compared with 1907. In the central and eastern region however the construction of wooden buildings decreased 25 per cent in 1907 as compared to 1906 and *decreased* 24 per cent in 1908 as compared to 1907.

These data are from the annual reports on building published by the United States Geological Survey, in Statistics of the Clay-Working Industries in the United States for 1906 to 1908.

[43] "Shortly after it was generally known that the rates were to be advanced, orders began to cease. * * * This applied not only to buyers of lumber for retail yards but to the railroad concerns, who, in some instances, withheld their orders until they could determine what was going to occur, and in other instances stated that they would not buy until after the advance went into effect and then they expected to be able to buy lumber at the mills much cheaper." Testimony, I. C. C., Record of Cases 1327, 1329, 1428; p. 1038.

Thus if the increases were upheld buying among the trade would decline. If they were denied the railroads who were the greatest customers of the West Coast mills would curtail their orders. The Forest Service has determined average mill prices of fir lumber: 1906, $14.20; 1907, $14.12; 1908, $11.97. It must be apparent that the decline can be only partially attributable to the influence of the panic of 1907. Of the contributory causes, the rate increase and the uncertainty incident to it were probably the most important.

[44] Ripley, W. Z., Railroads, Rates and Regulation, 1912, pp. 150, 489.

[45] In Circuit Court of the United States for the District of Minnesota, Third Division, Complaints in Equity Nos. 883, 884, 885, p. 9. [Case 883 was I. C. C. Case 1327; 884 was I. C. C. Cases 1329 and 1335; 885 was I. C. C. Case 1428.]

Third, the west-bound empty car movement. The Commission prac-
lly restored the old rates. The decision was in part:

> "No adjustment of rates made in the interest of carriers or of wholesalers should be permitted if it antagonizes unduly the public welfare. Considering the question before us as an economic problem—two things should be secured: First, these commodities should be brought to the consumer at the least possible expense; second, in both transportation and distribution unfettered competition should be maintained, thereby securing to the consumer the benefits to which he is entitled."[46]

The railroads appealed to the United States Circuit Court, which
held practically all the increases.[47] Final judgment was rendered in
nuary, 1912, by the Supreme Court, confirming the action of the Inter-
te Commerce Commission in the following decision:[48]

> "Considering the case as a whole, we cannot say that the order [of the Commission] was made because of the effect of the advance on the lumber industry, nor because of a mistake of law as to presumption arising from the long continuance of the low rate, when the carrier was earning dividends, nor that there was no evidence to support the finding. If so, the Commission acted within its power, and * * * its lawful orders cannot be enjoined."

The implication here is that the Court does not consider the fact of
jury to the lumber industry, caused by a decline in mill prices and by
partial loss of market, nor "vested rights" in the continuation of low
tes on lumber as sufficient grounds per se for denying an increase.
he adjustment of lumber rates "lies in the contest between the rail-
oads and the lumbermen as to whether the rate shall be higher or
wer within the margin that the traffic will readily bear."[49]

The decisions in the southern pine cases and in the transcontinental
mber rate cases cited indicate that rate increases have not been held
alid on the ground, per se, of increased prosperity in the industry nor
f the ability of the traffic to bear a higher rate. The rates on ship-
nents of lumber have not therefore been generally increased as the prices
f lumber have risen. In fact, the average rates applying over impor-
ant routes of lumber shipment have remained relatively stable. Thus
as the market for medium and low grade lumber been greatly extended
nd the conditions of competition between widely separated sources of
upply much intensified.

Willamette Valley to San Francisco rate. In 1910 the Interstate
ommerce Commission denied[50] a rate of $5 per ton (raised in 1907
rom $3.10) on rough common fir lumber from Portland and Willamette
Valley common points to San Francisco. The railroad (Southern Pacific)

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[46] Ibid., pp. 308, 309. The dissenting opinions are in 14 I. C. C. 1-74; see Ann. Rep. of I. C. C. 1911, p. 46; also 219 U. S. 433.

[47] Dunn, S. O., op. cit., p. 32.

[48] 32 Supr. Ct. Rep. 109; 222 U. S. 541, 555.

[49] McPherson, L. H., op. cit., p. 138.

[50] 14 I. C. C. Rep. 61.

appealed to the courts. The Supreme Court set aside the restraining order on the ground that the Commission, in seeking to protect the investment of capital in lumber manufacture, had not been governed by the intrinsic reasonableness of the rates.[51] A counter complaint was then filed by the lumbermen. In response to the verdict of the Supreme Court the Commission then permitted an advance in the rate to $3.40. The railroad at once appealed to the newly established Interstate Commerce Court. In 1912 the Court completely sustained the Commission's order on the ground that a carrier, having induced the investment of capital in the lumber industry under an implied promise of low rates, is under obligation to refrain from subsequently charging the limit of what the traffic will bear.[52]

Principles asserted in the lumber rate cases. Interstate Commerce Commission. In the southern lumber cases[53] the Commission has held that lumber rates should be relatively low, because:

First, the life of the lumber mill is limited, at the end of which large investment in plant and equipment is practically valueless.

Second, traffic in lumber at low rates has yielded the carriers an increasing net revenue.

Third, lumber is inexpensive freight.

Fourth, lumber furnishes a large and a constant tonnage, i. e., the year round.

Fifth, the minimum carload has been so increased that a car of lumber yields a relatively high actual revenue, "greater in nearly every case than on articles * * * carrying higher ton-mile rates."[54]

Sixth, lumber is an article of general utility.

The principles involved in the West Coast lumber cases were almost identical.[55]

Supreme Court. The attitude of the Supreme Court on the important question of the adjustment of rates to competitive markets on lumber requiring a relatively long haul has been expressed:[56]

> "When the section says that no locality shall be subjected to any undue or unreasonable prejudice or disadvantage in any respect whatsoever, it does not mean that the Commission is to regard only the welfare of the locality or community where the traffic originates, or where the goods are shipped on the cars. The welfare

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[51] 219 U. S. 433.

[52] U. S. Com. Ct. No. 59, Apr. Sess. 1912.

[53] Central Yellow Pine Association v. I. C. R. R. Co. 10 I. C. C. Rep. 505; Marten v. L. & N. R. R. Co. 9 I. C. C. Rep. 581, 589; Tift et al. v. Southern Railway Co. 10 I. C. C. Rep. 548; Tift v. Southern Railway Co. 138 Fed. 753-764; Aff. in 148 Fed. 1021.

[54] Complaints in Equity, Nos. 883, 884, 885; U. S. Circ. Ct. for Distr. of Minn., 3rd Div., p. 321.

[55] Ibid., p. 212, "It may be fairly stated that this case is on all fours with the Yellow Pine Case [10 I. C. C. Rep. 505] in every essential particular."

[56] T. & P. R. Co. v. I. C. C. 162 U. S. 197; decided, March, 1896.

of the locality to which the goods are sent is also, under the terms and spirit of the act, to enter into the question. * * *

"One class of cases, unquestionably intended to be covered * * * is that in which traffic from a distance, of a character that competes with the traffic nearer the market, is charged low rates, because unless such low rates were charged, it would not come into the market at all. It is certain unless some such principle as that were adopted, a large town would necessarily have its * * * supply greatly raised in price. * * * the public have an interest in * * * the carriage at a rate which will render that traffic possible, and so bring the goods at a cheaper rate, and one which will make it possible for those at a greater distance to compete with those situate nearer to it."

It has been held by the courts that the "public at large is greatly interested in competition and the more favorable prices which it brings and for that purpose the public is interested in keeping open the larger markets of the country *to all points of production and supply.*"[57]

Where the traffic from a distance can compete with traffic nearer the market, the public is interested in having the greater-distance traffic carried at rates which will enable it to compete with the traffic which is nearer the market.

Transportation costs as a price influence. As respects the influence of transportation costs general lumber prices in the United States have been changed:

First, when the total traffic in lumber has remained constant and the same distribution of such traffic has been maintained among the several sources of lumber supply, while the rates themselves have been either raised or lowered;

Second, when the rates have remained constant while the proportion of lumber from the more distant sources has increased.[58] The latter type of price influence has been connected, in the United States, with a dynamic condition in the lumber industry. It represents one way in which the exhaustion of timber supply near to consuming centers has affected prices of lumber. This has been well illustrated in the history of the North Atlantic lumber markets which have depended successively upon lumber: 1, manufactured locally; 2, from Maine and from northwestern Pennsylvania; 3, from the Great Lakes region; 4, from the South, and recently to an increasing extent; 5, from the Pacific Northwest.[59]

The cost of transportation has increased, other things being equal, as the average distance between the sawmill and the market has increased. This cost has of course entered into the selling price of the lumber in the consuming market.[60] This factor has accounted for much of the difference in price between lumber manufactured under conditions of surplus timber and lumber produced under conditions of relative exhaustion of timber supply close at hand.[61] Price changes caused by changes in the rates (which may hasten or retard the exhaustion of any particular source according as such rates discourage or stimulate competition in the same markets from other sources) have no necessary or direct connection with price changes due to relative exhaustion. The concern of the present chapter is only with the influence of *changes* in the rates.[62]

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[57] Italics not in original text; 162 U. S. 197, (217, 218).

[58] E. g., prices of lumber delivered in the market would rise, other things being equal, if the proportion of the total supply contributed by each source remained constant while the rates from such sources were increased. Or prices would similarly rise if the rates from each source remained constant while the proportion of the supply increased, which had been contributed by those sources having the highest rate on shipments to market.

[59] See infra., Diagram 8, p. 35.

Influence of changes in rates. From the brief history of the fostering by the railroads of the lumber industry in certain regions and of the attitude of the Interstate Commerce Commission and of the courts, upon subsequent increases in the lumber rates, it may be concluded that, since 1894, no increases have occurred which have substantially influenced general lumber prices.[63] That the general attitude of the Commission in reviewing lumber rates has not changed is shown in several recent orders annulling increases attempted by the carriers.[64]

The grounds cited for the narrow definition of "reasonableness" as applied to lumber rates, are such as would have applied in principle, ever since the extension of commerce in lumber beyond the limits of merely local traffic. The cases cited concern those rates which have been the most important in the actual distribution of lumber, i. e., from Lake States mills to central markets; from the southern lumber region to central and northern markets; from West Coast points to western, middle-western and eastern markets. In all these cases the advances have either been denied entirely or greatly reduced. It may be therefore assumed that, had any rate increase substantially affected the market or considerably lowered the mill price of lumber bearing such rate the increase would have been sharply contested.[65] There is no record, however, of any contested rate affecting the transportation of lumber from any of the three chief sources[66] of supply to their important consuming markets, of which any substantial increase has been approved. Nor, in fact, has there been any considerable reduction in such rates since 1894.[67]

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[60] That is, provided the resort to distant sources is the result of natural conditions and not an arbitrary and unwarranted attempt to force on a given market the product of a distant source when a source nearer the market is capable of supplying the entire demand at a lower price.

[61] Ann. Rep. of Dir. of Mint, 1913, p. 68: "The greatest rise of all [prices] in the last 15 years in the United States has been in lumber. * * * All of the products of timber have been going higher because near-by supplies were being exhausted."

[62] The influence of the increased proportion of the lumber consumed, which has been marketed on the higher rates, is treated as one of the phenomena of exhaustion of timber supply, in Ch. VI, infra.

[63] That is, permanently. The transcontinental rate increases, pending final adjudication for nearly five years, exercised a considerable temporary influence, as shown above, upon the prices of West Coast lumber during 1907 and 1908.

[64] E. g., in 1913, I. C. C. Cases Nos. 4763, 4978; opinions, Nos. 2197, 2215.

[65] That lumber tariffs have been frequently contested is shown by the fact that the I. C. C. docket on April 11, 1908, showed 37 such complaints. McPherson, L. H., op. cit., pp. 289, 290.

Between the period of the panic of 1873 and the era of railway and industrial consolidation about 1900 there had been a gradual general decline in rates on competing lines.[68] The reversal of policy since that time has had little actual influence on lumber rates. As even a partial explanation therefore of the rise in general lumber prices since 1897, changes in freight rates on lumber, on the average, have been inconsequential. As an incident, however, to the phenomena of relative exhaustion of timber conveniently located, the length of the *average* haul to market of lumber shipments, has continuously increased. Transportation costs have therefore constituted a growing proportion of the delivered prices. For example, on the basis of its mill prices for 1911 as recorded by the Forest Service, the average transportation cost to competitive markets on yellow pine lumber was 36 per cent of the average prices at the mill.[69] The proportion for cypress lumber, based on mill prices as recorded by the Southern Cypress Manufacturers' Association for 1913, was 24.6 per cent. Similar figures for earlier periods are not available. These phenomena are of course entirely distinct from those due to *changes* in rates.

Labor Conditions in the Manufacture of Lumber.

Although labor has been the most important single productive factor in the lumber industry and wages the largest single item in manufacturing costs, labor troubles have been rare. In nearly all branches of the industry there has been, in this particular, surprising stability.[70] In the southern and West Coast regions employment both in the woods and in the mill has normally continued throughout the year. In the North, where employment is seasonal, lumber manufacture has formed a link in an interesting "industrial chain." The one-crop farming of the Mississippi Valley creates a heavy demand for labor at harvest time. In the spring many thousands of lumbermen have followed the rafts down the river; have followed the harvester from Texas north to the Dakotas; have accompanied the threshers in the North until the early winter and have returned on the granger roads to the northern forests. In the great lumber producing sections, therefore, practically continuous employment has been provided, either directly or indirectly.

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[66] The Lake States; the southern pine region; the Pacific Northwest. Among the important lumber rates from these sections have been, in cents per 100 pounds.

Note: Changes only in the rates are given.
Houston to Omaha: 1900, 23; 1908, 26.5; 1910, 25.
Seattle to Omaha: 1887, 60; 1890, 55; 1895, 60; 1899, 50; 1907, 55; 1908, 50.
Seattle to Chicago: 1887, 60; 1893, 50; 1900, 60; 1908, 55.
Spokane to Chicago: 1898, 50; 1907, 55; 1908, 52.
San Francisco to Chicago: 1900, 60.
New Orleans to Chicago: 1900, 23; 1908, 24.
Hattiesburg to Chicago: 1899, 22; 1900, 24; 1903, 26; 1907, 24.
Minneapolis to Chicago: 1900, 13; 1903, 10.
Seattle to Minneapolis: 1887, 60; 1889, 55; 1894, 40.
Seattle to New York: 1900, 83; 1902, 85; 1903, 80; 1907, 85.
New Orleans to New York: 1900, 38; 1909, 35.
Hattiesburg to New York: 1900, 33; 1903, 35.
Savannah to New York: 1900, 26; 1901, 25.
Norfolk to New York: 1900, 11; 1903, 12; 1910, 13.
Memphis to New York: 1900, 31.

These statistics have been furnished directly by the Division of Tariffs of the Interstate Commerce Commission. They are up to date to Feb. 21, 1914. The changes since 1894 have not been substantial nor can they have caused any considerable change in the market price of lumber.

[67] See supra, p.

[68] Ripley, W. Z. op. cit., p. 488.

[69] For. Prod. 1912, p. 50; 62 Cong., 1 Sess., 1911, S. D., Vol. 6, No. 56, p. 774: rate.

Since 1900 there have been occasional efforts at unionization. In 1911 "The Brotherhood of Timber Workers," newly organized among the woods- and millworkers of Louisiana and Texas, was met by a brief lockout instituted by the "Southern Lumber Operators' Association," organized in 1906, to combat unionization among employes. A similar lockout occurred in 1912. As a rule, however, lumber manufacture has been free from the disputes which have so harassed other industries. General mill labor is unskilled; the skilled labor has been well paid.[70a] Any substantial general curtailment or irregularity of lumber production cannot therefore be attributed to adverse labor conditions.

The Lumber Trade Press.

The lumber trade journals have been, in general, reliable as sources of trade information. Their attitude toward the quotation of current prices has been a reflection of their editorial policy.[71] That this policy has frequently changed with changes in ownership and in affiliations is familiar to the trade. The editor of one of the journals has recently said that the "lumber trade journals have not in recent years given the accurate data regarding prices which they did ten or twelve years ago."[72]

Both "bulls" and "bears" may be found among their correspondents but because of the close relation, in general, between the lumber manufacturers and the journals the "bulls" have predominated. In many directions the interests of the producer and of the distributor are identical. On the subject of prices, however, interests clash. The manufacturer wants high prices; the distributor who must buy from the mill is interested in low prices. The trade press, because of its practical dependence upon the manufacturing interests, has tended almost invariably to support the manufacturer.[73] The trade, however, has soon adjusted its interpretation of quoted prices by a discount proportionate to the ascertained "bullish" tendency. In viewing the entire trade lit-

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[70] There have been occasional strikes in city lumber yards. These however have had little effect upon wholesale prices except as they may have temporarily diminished buying by such yards.

A. L., Feb. 4, 1905, p. 69.

[70a] Rev. of Rev., Vol. XXVII, 1903, p. 323.

[71] The Lumber Industry, Pt. IV, p. 28. Quotations are of wholesale prices.

[72] Johnston, B. A., ed., Lumber World Review to Smith, Geo. K., Sec. Yel. Pine Manuf. Assoc., Dec. 4, 1911; letter.

[73] A. L., Aug. 10, 1907, p. 72.

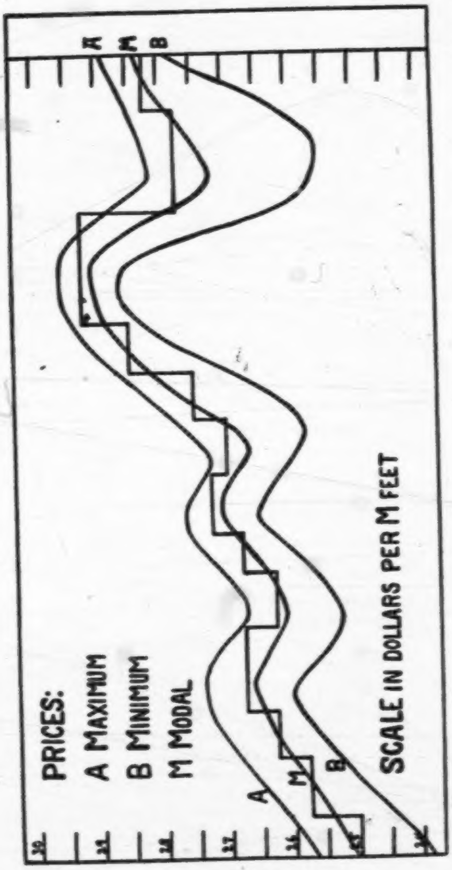

DIAGRAM 3.
The Range of Lumber Prices.

erature, it has appeared best, in the interests of better comparability, to use *relative* prices in the present study. Thus the "bullish" (or "bearish") tendencies have been reduced to a comparatively small and almost constant factor.[74]

Normal Range of Actual Prices.

There has been, normally, a more or less wide range of variation in price, in the same [large] market, of lumber of the same species, grade and item. This range (i. e., the difference between the highest and the lowest prices paid) of actual sales prices has been less than 4 per cent under steady market conditions of the modal or representative price. Occasionally, since 1897, in certain markets and under abnormal conditions, it has been 10 per cent or even greater. The principle is illustrated in the accompanying diagram.[75]

In periods of rising prices the range has tended to contract; in periods of falling prices, to expand. When prices have reached a high point the difference between the mode and the highest price within the range has been greater than the difference between the mode and the lowest price. On the other hand, when prices have substantially declined the difference between the mode and the lowest price within the range has been much greater than the difference between the mode and the highest price. Thus the lowest prices (see Diagram 3, curve B) within the range have tended to rise more rapidly and to fall more rapidly than have the highest prices (see curve A).

"LIST PRICES."

An important fact, because of its bearing upon the determination of influences affecting the level of general lumber prices, is shown in the relation of manufacturers' (or wholesalers') "list" prices to the prices of actual sales within the range. During periods of sharply rising prices, actual selling prices have been often above "list." When actual prices have declined, however, the "list" prices have almost invariably been substantially higher than the prices at which actual sales have been made.[76] Joint action by lumber manufacturers through their associations and through their efforts to maintain association list prices, has apparently prevented actual prices neither from rising higher nor from falling lower than "list."

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[74] The relative prices hereinafter used, which have been taken from trade publications, are almost exclusively for the period before 1897. During this period prices published in the journals closely approximated the prices of actual sales.

[75] A represents the upper limit of the range; B the lower limit; M the modal price or the price at which the bulk of the sales were made. The rectangular lines represent the current "list" prices as issued by the several manufacturers' associations. The diagram typifies many of the price phenomena presented by the actual prices collected, since 1907, by the Bureau of Corporations. Over a million separate prices were collected from invoices. For a single item in the same market for the same month, as many as 50 separate prices were frequently taken from the invoices of several different concerns. These were found to be distributed over a certain range. The above diagram is based on the tabulations of such prices. As there has been no considerable period since 1897 during which lumber prices have maintained a uniform level it has been possible to study their behaviour only for periods of either rising or falling prices.

[76] The effect upon lumber prices attributable to the efforts of associations of lumber manufacturers to maintain price lists is discussed in Chapter VII, infra.

Grades of Timber Used in the Manufacture of Lumber.

Two factors may increase the quantity of lumber in a given market received from distant sources:

First, improved transportation facilities (expressed in lower rates to the market).

Second, higher lumber prices, which increase the ability of the product of distant sources of timber supply to bear *existing* costs of transportation.

The entire accessible supply of timber[77] at any given point in time (A) is represented in the following diagram.

Thus an appraisal, at point A, of the anticipated future stock of available timber, classified according to grades, in the order of their prospective utilization, follows the curve AXB. During the years immediately succeeding such appraisal the finest of the timber is cut, the timber resources at successive periods of time thereafter being represented by successive points down the line AX and each interval marking a nearer approach to the enforced use of medium and low grade (including second growth) timber. But, as the remaining supply becomes of a more and more inferior quality, two influences,—first, relatively high prices for high grade lumber; and second, cheaper transportation facilities from a more distant source of supply not contemplated in the original appraisal, may make available additional supplies of timber of *superior* quality. The actual curve thereafter follows XB, the exact position of the critical point X having been determined by the character of the demand for timber and by the conditions which have made accessible the new supply of natural agents.[78]

Conditions of Timber Supply in the United States.

In the chronology of lumber manufacture in the United States successive appraisals of timber supply (from the standpoint of any given market) have followed an undulating curve, such as that of which only a single node and internode are graphically represented in Diagram 4. The last remaining source of virgin timber supply in the United

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[77] Fernow, B. E., Considerations in Gathering Forestry Statistics; in Publications of American Statistical Association, Vol. VI, New Series, No. 44, 1898, pp. 164, 165.

> " * * * whether the mills are sawing only logs 10, 12 or 14 inches in diameter, as was the practice in the pineries in 1880, or whether they have adapted their machinery and methods to scale down to 5 inches, as is now done in some parts of Maine and elsewhere, must make a difference in his [the] statement of supplies at hand or becoming available."

[78] The opening of the Lake States forests, for example, typifies curve XB'. Had the eastern markets continued to depend solely on local supply the curve of production relative to eastern markets would have been along AXB. The low eastbound transcontinental lumber rates (1894) produced a similar undulation in the curve of timber supply tributary to the middle-western markets. For the application of this principal from a different point of view, to the New York market, see infra., p. 35, Diagram 8.

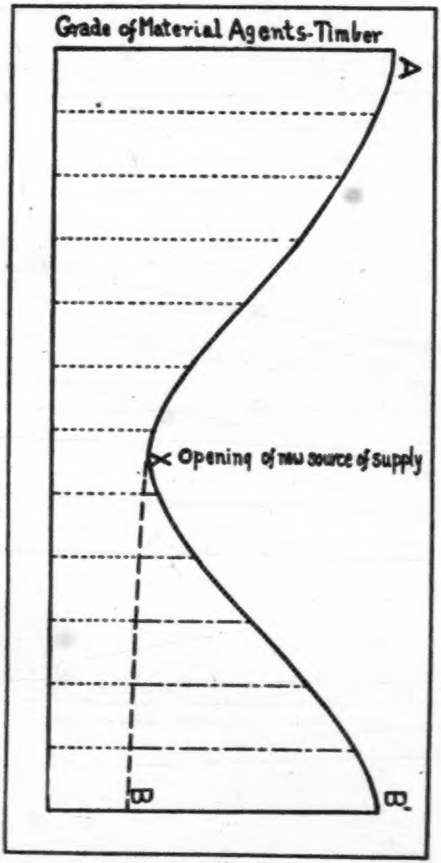

DIAGRAM 4.
The Available Resources in Standing Timber.

States has now been requisitioned. A present-day appraisal therefore of available future stumpage may be made at point A. No opportunity, however, remains, generally speaking, for opening up a hitherto inaccessible supply. Such an appraisal includes a large present stock of timber of high grade; beyond it an indefinite perpetuation of medium and low grade timber, including stumpage of natural regrowth. Analogy to the past history of lumber production indicates, therefore, that the present prospect of the future domestic timber supply, lies along the curve AXB.

It is possible that artificial reforestation[79] and natural regrowth will so replenish the supply of high grade agents, and that a reduction in per capita consumption of lumber will so decrease the demand for them that the necessary supply of timber may become self-perpetuating. The crux of the problem of the future lumber supply of the United States lies therefore in the task of creating an adjustment of forests wherein annual consumption of merchantable timber is replaced by annual regrowth.[80] Such an adjustment must provide for a suitable proportion of high grade timber. Furthermore, the adjustment must be completed before the surplus represented in the present appraisal, is exhausted.[81]

Former United States Forester, Gifford Pinchot, in an address to the National Wholesale Lumber Dealers' Association on the future influence of the timber owned by the Government in the national forests said that[82]

> "it is perfectly obvious the possession of this vast amount of standing timber by the government, is going to have a steady effect in [*sic*] prices and is going to prevent the cornering of the product by any man or combination of men and is going to act very powerfully for the general good. That, we all see, will have a very steadying effect by the possession of these great areas of timber * * *

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[79] Schenck, C. A., Forest Policy, pp. 116-127.

[80] See Compton, Wilson, The Business of Constructive Forestry, A. L., Oct. 10, 1914, pp. 40-42.

[81] Even considering the more pessimistic view, i. e., of our ultimate dependence upon importation for the supply of lumber, first from Canada and later from South America or Siberia, the principle remains the same. Such supplies are themselves not inexhaustible. Ultimate recourse must be to regrowth. There are many reasons for belief in the practicability of the United States maintaining independence of foreign sources of timber supply. First, more than one-half of the original stand of merchantable timber in continental United States yet remains. Second, a large proportion of this remainder, especially in the West, is of high grade. Third, one-fifth of the present total supply belongs to the United States; the judicious use of this timber would greatly facilitate the adjustment by supplying the demand in the meantime. Fourth, there are now substantial efforts at reforestation, especially by the United States and by the individual states. Fifth, unnecessary waste in the production and consumption of lumber is declining. Sixth, the increasing use of substitutes tends toward a substantial reduction in per capita consumption. Seventh, higher prices which, other things being equal, will be caused by the probable increase in the proportion of lumber received in the consuming centers from the most distant sources (i. e., bearing the highest transportation costs) will tend to cause an increase in substitution and a further decline in per capita consumption of lumber. If these factors be decisive, the prospect of that vague future condition in the United States, conventionally referred to as a "timber famine," has been frequently overrated.

[82] Ann. Rep. Nat. Whol. Lumb. Deal. Assoc., 1907, p. 37.

> which will be put to very vigorous use * * *. This timber will be removed under restrictions which will make the forests permanent."

The application, however, to the future of the lumber supply, of the principles evolved out of the historical relation, during any period, of lumber prices[88] to the estimated stock of natural agents, does not fall within the scope of the present study.

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[88] The result of a superficial investigation of this subject by the United States Senate has been expressed as follows: "Among the many causes contributing to the advance in prices may be enumerated: * * * Reduced supply convenient to transportation facilities of such commodities as timber." U. S. Senate, Wages and Prices Investigation, 1911, Vol. I, p. 145; in 61 Cong., 3 Sess., S. D., Vol. 63.

CHAPTER II.

ORGANIZATION OF THE LUMBER INDUSTRY: PRODUCTION.

Magnitude of the Lumber Industry.

Lumber[1] constituted, in 1909, 59.2 per cent of the value of the "Lumber and Timber Products"[2] of the United States. In sixty years the annual output, in feet board measure, had increased 790.2 per cent:

TABLE 1.

Year	Product[3] in feet B.M. (000,000)	Increase per cent	Population	Increase per cent
1850	5,000	....	23,191,876	....
1860	8,000	60.	31,443,321	35.6
1870	12,755	59.4	38,558,371	22.6
1880	18,091	41.8	50,155,783	30.1
1890	23,497	30.	62,947,714	25.5
1899	35,084	49.3	75,994,575	20.7
1904	34,135	2.7*	....	....
1909	44,509	30.4	91,972,266	21.

*decrease

The census figures upon which this table is based are only approximations, generally under the truth.[3a] Changes in methods of enumeration have impaired somewhat the comparability of these statistics. No data from other sources have, however, been available.

Between 1899 and 1904 the lumber output of the United States increased in total value, 11.6 per cent; between 1904 and 1909, 57.1 per cent. From 58 million dollars in 1850, the value of lumber and timber products increased to 1,156 million dollars in 1909, or 1876 per cent. So much greater has been the rate of increase in lumber production than in population, that the per capita output which, in 1850, was 216 feet, has increased to 484 feet in 1909. In per capita utilization of lumber, Canada alone with 468 feet (1909) has approached the United States. The corresponding total consumption of wood, including lumber, timber and firewood, has been estimated (1910) at 260 *cubic* feet. This is 35.4 per cent greater than that of Canada; 1900 per cent greater than that of Italy.[4] In total and per capita consumption[5] of lumber and wood, the United States has led the world.

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[1] Sawed boards, deals, planks, battens, joists, scantling and other dimension timbers, rough or dressed, which have undergone no additional manufacture for special uses.

[2] $1,156,129,000; (includes the products of saw, lath, shingle and planing mills; of logging camps; or veneer and box factories). The value of the lumber alone was $684,479,859 in 1909; $435,708,084 in 1904; $390,489,873 in 1899. The classification, "Lumber and Timber Products," is outranked in value (1909) only by slaughtering and meat-packing, and by foundry and machine shop products.

Abstract, 13th Census, pp. 442, 508, 509.

[3] The foot board measure is the universal unit of measurement, in the United States and in Canada, of lumber, logs and stumpage. It is one foot square by one inch thick. Price quotations are almost invariably on the "thousand feet," (M feet B. M.). "Stumpage" means standing timber of merchantable quality, i. e., suitable for manufacture into lumber. "Logs" are trees trimmed and cut into suitable lengths for the sawmill. Unless qualified the word "foot" means hereafter "foot board measure."

[3a] For. Prod. No. 2, Bur. of Cens., 1909, p. 3.

Timber Resources.

There are now about 2.8 trillion feet of standing timber in the United States (1911).[6] Of this 78 per cent, or 2.2 trillion feet is privately owned. The rest stands in the National Forests, on the public domain or in state forests. In the Pacific Northwest stand over 1.5 trillion feet; in the Southern States pine region, 650 billion feet; in the Lake States, 100 billion feet. The remainder, about 550 billion feet, is distributed over the Rocky Mountain States, the central hardwood region and the Northeastern States. Of this latter classification about 115 billion feet are of non-private ownership.

Over 90 per cent of the government-owned stumpage, or about 500 billion feet, stands in the Pacific Northwest. This region holds 54 per cent of the total remaining supply. Of the 5.2 trillion feet estimated to have been the original stand in the United States, the remaining stumpage now constitutes 54 per cent.[7] Replacement by annual growth is about one-third of the average annual cut.[8]

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[4] Greater than Russia, 313 per cent; than Germany, 610 per cent; than Great Britain and Ireland, 1757 per cent. Zon, R., The Forest resources of the World, For. Ser. Bull. 83, 1910, pp. 70, 71.

[5] In 1909, 100 million cords of firewood; 45 billion feet of lumber; 15 billion shingles; 1 billion posts, poles and fence rails; 140 million cross-ties; 2 billion staves; 150 million sets of heading; 400 million barrel hoops; 3 million cords of domestic pulpwood; 165 million cubic feet of round mine timbers; 1.2 million cords of wood for distillation; 1 million cords of tanbark. Kellogg, R. S., Lumber and Its Uses, 1914, pp. 316, 317.

Since the average excess of exports over imports has been inconsiderable, domestic consumption of wood products has been practically equal to domestic production. Zon, R., op. cit., p. 72.

[6] The Lumber Industry, Pt. I, 1913, pp. 65-77; 79, 80. The value of this timber was estimated (1911) at not less than $6,000,000,000. Ibid., p. 31.

[7] Original and Present Timber Supply of the United States:

TABLE 2.

Region	Original (billion feet)	Present (billion feet)	Present Per cent of original
Northern	1,000	300	30
Southern	1,000	500	50
Rocky Mountain	400	300	75
Pacific	1,400	1,100	79
Central	1,400	300	21
Total	5,200	2,500	48

From: The Timber Supply of the United States, For. Ser. Circ. 166, 1909, p. 6.

[8] Zon, R., op. cit., p. 70: estimate 28.6 per cent; also Standing Timber, The Lumber Industry, Pt. I, p. 5: estimate 33 per cent.

Extent of the Lumber Industry.

"The beginning of the Twentieth Century marked, with approximate accuracy, an epochal period in the timber and lumber history of the United States of America."[9] The Pacific Northwest, stronghold of the last source of virgin timber, has begun to ship large quantities of lumber to the markets which have been previously supplied by the older regions of lumber manufacture. The lumber market is nationwide; yet not until comparatively recent years have remote sections manufactured large quantities of lumber for other than local consumption. High grade West Coast products, despite the heavy transportation costs, have found a market even in the Eastern States. More than five per cent of the annual product of West Coast lumber is now marketed in the Atlantic States. Fir flooring and finish of superior quality, for example, thus often bears a transportation cost to market of from $15 to $18 per thousand feet.[10] The manufacture of lumber for interstate or interregional commerce is now practically co-extensive with the geographical distribution of merchantable stumpage.[11]

Species of Commercial Importance.

Ranked according to their importance in the manufacture of lumber in 1912, the commercial woods are:

Species	Sources	Per cent of total[12] cut in 1912
Yellow pine	Southern States	37.6
Douglas fir	Pacific Northwest	13.2
Oak	Central States	8.5
White (northern) pine	Lake States	8.
Hemlock	Lake States; Pa.	6.2
Spruce	New Eng.; W. Va.	3.2
Western pine	Rock Mt. and Pac. States	3.1
Maple	Mich., Wis.	2.6
Cypress	La., Southern States	2.5
Poplar	Central States	1.6

These ten species contributed 86.5 per cent of the output in 1912. The remainder, distributed among more than a score of different species, consisted chiefly of minor hardwoods. All of the species conspicuous in the history of lumber manufacture are in the above table. From the time of early settlement until the close of the last century, white pine had been sought for a range of uses wider than that to which any other species has since been found adapted.[13]

The original supply of white pine came from the Northeastern States. Crossing New York and Pennsylvania, the center of production, after the Civil War, reached the heart of Michigan and the Lake States.

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[9] Defebaugh, J. E., History of the Lumber Industry of America, Vol. I, 1906, p. 272.

[10] 62 Cong., 1 Sess., 1911, S. D., Vol. 6, No. 56, Lumber, p. 720.

[11] Kellogg, R. S., op. cit., Table 107, pp. 318, 319.

[12] Forest Products, Lumber, Lath and Shingles, 1912, pp. 10, 14, 15.

[13] American Forestry, Jan. 1915, pp. 36, 37.

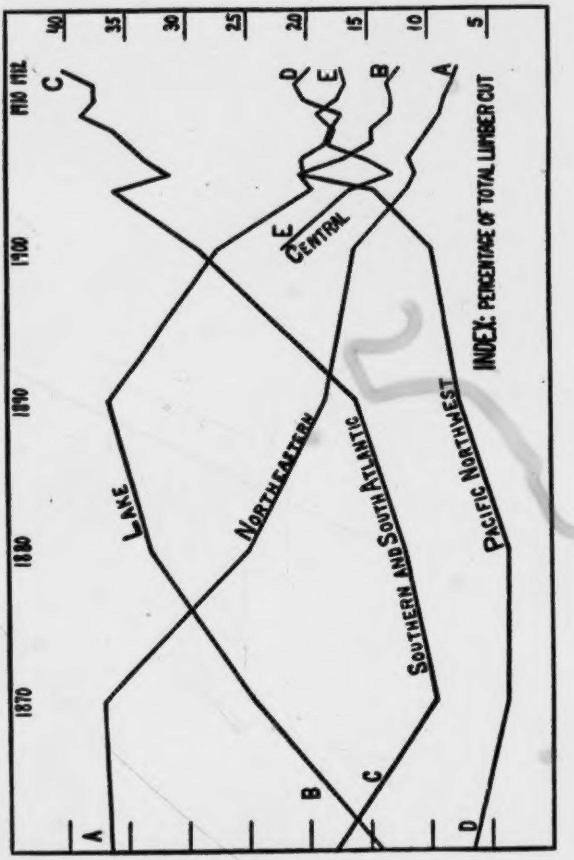

DIAGRAM 5.
Proportionate Production of Lumber by Geographical Divisions.

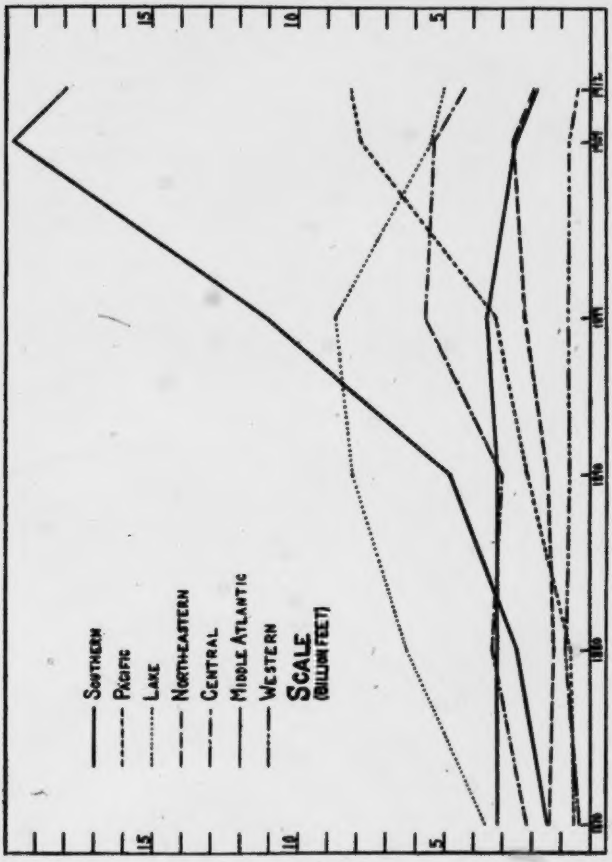

DIAGRAM 6.
Actual Production of Lumber by Geographical Divisions.

Within twenty-five years it has shifted to the southern pine region and, more recently, for the highest grades of lumber, to the Pacific Northwest. The historical shift of sources is shown in the accompanying diagrams.[14]

Of the once abundant white pine there remains, in the Lake States, less than 16 billion feet[15] and in the entire United States, less than 23.3 billion feet of merchantable quality. A most conservative estimate[16] of the total original stand at 450 billion feet indicates the extent of the exhaustion that has resulted in the shifts described in the above diagrams.

The following excerpt from the report[16a] by the Chief of the Division of Forestry in 1897 on "White Pine Timber Supplies" indicates that, during the eighties, the relative scarcity of white pine had been exaggerated but that, by the end of the century, the degree of exhaustion had become acute.

> "There are no statistics of timber standing in the United States available which can claim to be accurate in any mathematical sense, nor would it be possible to ascertain such, if for no other reason than that the methods of utilization, which are largely dependent on changes of local and market conditions, change the amounts of material considered merchantable, harvested, or sawed from a given forest growth, the conception of what constitutes merchantable timber varying. * * * Ever since the publication of the statistics of the Tenth Census regarding the white pine timber standing—nearly fifteen years—there has been a contention as to their correctness. Time has proven their extreme inaccuracy, for, while then only eight years' supply was supposed to be standing, when the annual cut was 10 billion feet, we have, with an increased cut, lumbered white pine for sixteen years and still there is a considerable quantity left.
>
> "Yet, at last, the end is visible, and even the most sanguine can not longer hide the truth that within the next decade we shall witness the practical exhaustion of this greatest staple of our lumber market."

White pine contributed only 8 per cent of the lumber manufactured in 1912.

Early Manufacture.

One hundred years ago logging was practically confined to the coast and to the river courses of the East. The early sawmill was the accompaniment of each early settlement. Sawmill equipment then cost from 60 to 500 dollars.[17] Lumber was sawed to order for neighborhood consumption or was floated down the river to be sent to more distant markets, domestic or foreign. The mills were often connected with "gristmills" and the log owner paid a toll in kind for the sawing. That this method of small scale production continued until the middle of the century is attested by the census report, in 1840, of 31,560 "lumber-mills." The average product of each was valued at about 400 dollars.[18] In 1805 the price in Pittsburgh of choice white pine lumber rafted from the mills of western New York was only 5 dollars per thousand feet.[19]

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[14] Diagram 5 shows the percentage of the total cut produced in each of the four main historical sources of lumber supply. Diagram 6 represents the actual output, classified by grades, of each geographical division.

[15] Lumber Industry, Pt. I, p. 78; also For. Prod., 1912, p. 10.

[16] Maxwell, Hu, The Story of White Pine, in American Forestry, Jan. 1915, p. 42.

[16a] 55 Cong., 1 Sess., 1897, S. D., Vol. 4, No. 40, pp. 1, 2.

[17] American Lumber, in One Hundred Years of Industry and Commerce, (Depew) Vol. I, p. 196.

In 1838 were erected the first large sawmills at Willliamsport, Pennsylvania, where were later centered nearly fifty mills. The first mill in the Saginaw Valley, the future center of the great pine industry of Michigan, was erected in 1832, "to supply early settlers with building material; commerce in lumber was unknown here."[20] But the great Lake States pineries were as yet unexplored. The panic of 1837 produced a "lethargy that existed for some years."[21] Not until 1849 did the Lake States white pine industry revive. Thereafter its growth was rapid. During the early days in Michigan good white pine lumber was occasionally bought at 4 dollars a thousand feet at the mill.

Geographical Distribution of Manufacture.

The rapid settlement of the Middle West[22] after the Civil War greatly stimulated the development of the lumber industry. By 1870 had arrived the "golden age" of white pine manufacture in Michigan. It spread into Wisconsin and Minnesota. In 1882, while the yellow pine lumber of the South was as yet supplying little more than a local demand, more than 8 billion feet of white pine alone was cut in the Lake States. Ohio and Indiana had been almost denuded of their hardwood forests. Lumber was there manufactured as needed for home use. Clear-grained black walnut, white oak and hickory logs had been cut and ruthlessly burned.[23] The development of the treeless prairie states had made heavy demands upon the white pine mills. As the Lake States industry declined, a larger and larger market was diverted to umber from the South. Within the past fifteen years West Coast umber has become an active competitor in most of the middle-western states. Thus during the period from 1880 to 1900 the sources of lumber *supply* have become differentiated from the essentially consuming regions.

The Southern States,[24] the Lake States and the Pacific Northwest have (1911) 75 per cent of the remaining standing timber of the United

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[18] The exports of lumber and timber products during the preceding fifty years averaged less than $5,000,000 per annum.

[19] American Forestry, Jan. 1915, p. 44.

[20] Saginaw Valley Statistics for 1881, E. Cowles, ed., p. 3. This was the first team sawmill in the West.

[21] Ibid., pp. 2, 3.

[22] This movement was greatly accentuated by the Homestead Act, 1861, and by other public land legislation.

[23] Farm houses are still standing in the Ohio Valley, the frames for which are of black walnut such as is now sought for "kings' table tops." Am. Rev. of Rev., Vol. XXXVI, 1907, p. 561.

[24] Includes: Texas, Arkansas, Louisiana, Alabama, Mississippi, Florida and Georgia.

States.[25] In 1912 the same regions produced 64.1 per cent of the lumber cut.[26]

Cycles of Lumber Production: Shifts in Sources of Supply.

In the chronology of lumber manufacture in the United States there have been discernible three complete cycles. The fourth—the last one possible—has been under way since about 1900. Before 1850 each region had depended upon its own production or upon a surplus near at hand for its lumber supply. The second cycle began in the fifties when continuous shipments from the Lake region were made to eastern markets. It lasted until the middle or latter eighties when the rapid extension of the market for southern pine marked the advent of the third cycle. The present century marked approximately the beginning of the fourth cycle which is concerned with the great timber resources of the Pacific Northwest. Diagram 7 represents the historical movements which have led to the present distribution of sources of supply for the great consuming markets.[27]

The consuming territory described[28] consists of the eastern, central and middle-western markets. Of the eight states leading in lumber production in 1850 not one has continued to occupy a similar position in 1914. Of the eight leading states in 1850, all were east of the Mississippi River; three were wholly and one partly east of the Alleghenies. Five of the eight leading states in 1912 were wholly or partly west of the Mississippi River and two west of the Rocky Mountains.[29]

To show more than the general changes has been impracticable. No attempt has been made to show the ever changing proportions between the quantities of the different grades of lumber produced. It is probable that medium grades now constitute the bulk of production. During the seventies and eighties, on the other hand, what are now called upper grades predominated. It is obvious, for example, that the eastern region has continued to manufacture small quantities of lumber of the upper grades. But, as the diagram indicates, it became dependent upon the Lake States, between 1870 and 1880, for the bulk of its supply. In the early period of surplus white pine manufacture most of the product was of the upper or medium grades. Only high grade timber was cut. Low grade lumber, as understood today, was relatively unsalable until domestic industries were developed and until an increase in population enlarged the local market for the low-priced product which was incapable of bearing the higher transportation costs to more distant consuming territory.

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[25] The Lumber Industry, Pt. I, pp. 79, 80.

[26] For. Prod., 1912, p. 8.

[27] Kellogg, R. S., op. cit., p. 317; Wood-Using Industries of New York, p. 8.

[28] The data upon which this chart is based have been taken from census records, from occasional tabulations by the lumber trade journals, from "Saginaw Valley Statistics" relating to the Michigan white pine industry, from monthly reports of "Yellow Pine Clearing House," Jan., 1904, to Sept., 1914, and from miscellaneous reports by lumber manufacturers' associations on the distribution of hemlock, northern pine, redwood and western pine; also Defebaugh, J. E., op. cit., Vol. I, esp. Ch. 24, 30; Vol. II, Ch. 13-18, 30, 31, 34, 39; Fernow, B. E., Economics of Forestry, Ch. 11.

[29] For. Prod., 1912, p. 8.

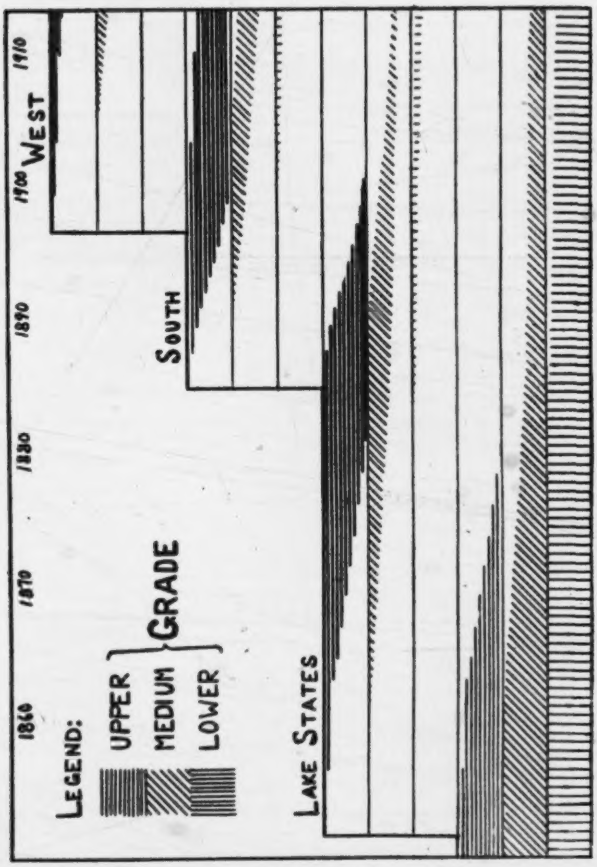

DIAGRAM 7.

Successive Sources of Lumber Supply to the Eastern and Central Markets, 1850 to 1913.

Note: Lowest shaded portion represents the consuming territory almost entirely dependent, before the Civil War, on local manufacture for local use. The first shipments from distant sources (Lake States) were of upper grades. The lower grades of West Coast lumber, by the end of the period covered, have not reached the central markets.

The consuming region here described has thus continued to supply itself with a large proportion of the lumber of inferior quality which it has used. The remainder of the lower grade stock it now secures from the Lake States and from the South. A considerable amount of medium quality lumber is also of domestic production. Most of it is secured from the Southern and the Lake States. For high grade material it is now chiefly dependent upon yellow pine and upon West Coast lumber.[30]

An investigation of the successive sources of the lumber supply in a single market (New York) has shown that, as the sources have become more and more distant, a less degree of exhaustion in each has been observable before lumber from a still more remote source has entered the market. Thus when West Coast lumber first entered the New York market (see Diagram 8) there was less evidence of exhaustion of southern pine than there had been of northern pine when southern lumber first became prominent in the metropolitan yards.

Since 1900, approximately, every region of the United States, therefore, capable of producing a surplus beyond domestic requirements has become an established contributor to the supply of eastern and central lumber yards. Of the total original stand of virgin timber one-half remains. Of this remainder 54 per cent stands in the Pacific Northwest. A large proportion of the stumpage of this region has been, however, physically inaccessible to adequate transportation facilities. Although, under prevailing conditions, the manufacture of timber so located has been uneconomical, this potential supply has acted as a check to any radical or unwarranted rise in lumber prices. To what extent concentration in the ownership of stumpage has interfered with the operation of this influence is discussed in Chapter IV.

The further development of the railway net in the forested regions may be expected to continue to diminish the influence upon the lumber supply of the relative inaccessibility of standing timber. How the influence of the extension of transportation facilities in discounting the economic disadvantage of remoteness from the markets has been reflected in the price of timber is illustrated in German experience:[31]

> "The relation of the average prices between the district having the lowest and that having the highest prices was:

1860	100:594
1870	100:380
1880	100:300
1890	100:222
1900	100:174

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[30] The Lake region still produces high grade northern pine in relatively small quantities. Lake States hemlock is ordinarily demanded for medium grade uses, especially for rough construction.

[31] Conrad, J., Handwörterbuch der Staats-Wissenschaften, IV Band, 3d Ed., pp. 414, 415.

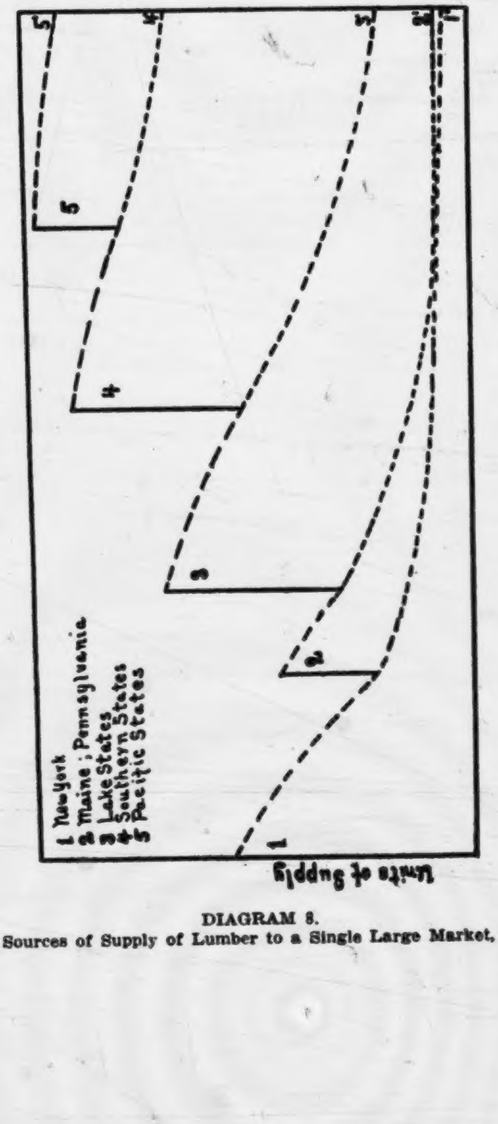

DIAGRAM 8.
Shift in Sources of Supply of Lumber to a Single Large Market, New York.

"In the year 1905 this relation was, in the case of

Lumber	100:166
Firewood	100:234
Wood of all kinds	100:206
Rye	100:104"

Evolution of Technology of Manufacture.

The technical processes of cutting and delivering logs to the mill and of sawing and marketing lumber have been highly developed within the last fifty years. Improvement in tools for the woodsman and the introduction of steam appliances for taking the logs from the woods have greatly increased the efficiency of modern logging methods. Thirty-five years ago standing timber not accessible to delivery to the mill by water was little valued. Ten years later the mills of Minneapolis, then the greatest lumber manufacturing point in the United States, received their logs by "drive" down the Mississippi River and its tributaries.[32] But the continuous recession of timber supply from the water courses has led to the use of temporary logging railroads or tap-lines built into the woods. In the Southern and the Lake States river drives have thus been largely superseded.

In the Pacific Northwest[33] both methods of log delivery prevail. The technique of logging has there attained its greatest perfection. The introduction of steam power in logging and of rail delivery of logs has made possible a more constant supply of raw material at the mill, less subject to the variations in seasonal and weather conditions. The evolution of the more expensive modern methods has been caused by the increasing inaccessibility of timber.[34] The adjustment of technological processes of production to dynamic changes in the conditions under which lumber has been manufactured, has been both rapid and precise.

THE SAWMILL.

The most important mechanical developments have been in the mills themselves. In 1850 the water mill was the common type. Its single "sash" saw was pulled down by the water wheel and returned to position by the aid of a heavy elastic pole. The adjustment by hand of the log carriage and of the "feeding" was generally superseded, between 1870 and 1885, by many of the mechanical devices which have since made possible the great increase in mill capacity. Steam power in the white pine region was first used in 1832. Gradually its use spread to all departments of lumber manufacture.[35] Among the great mechanical improvements have been the endless chain (for running the log into mill), the direct steam feed, which has replaced the rope and fric- n appliances; the intricate adjustments of the setting-works, blocks l "dogs"; the steam "nigger," a mechanical log-turning device; carriers lumber and refuse, and appliances for the return of waste to the rnaces.

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[32] Am. Rev. of Rev., Vol. XXXVI, 1907, p. 564.

[33] In 1909 more than 1,000 miles of logging railroad were in operation in Washington. The average log haul was about 12 miles.

[34] Tenth Census, 1880, Vol. IX, Forest Trees of North America. The maps in this report show that the river valleys throughout the eastern forests had been logged. In the South and in the Pacific Northwest also much of the timber adjacent to river banks had been by that time removed.

[35] There remain today a few small water-mills, mainly in the central hardwood belt. Their output is, however, negligible.

There have been also constant improvements in the methods and chanism of trimming, edging and of other operations incident to preparation of lumber for the market. Waste products of manu- cture have been greatly reduced.[36] Air-drying in yard piles has been adually superseded, notably in the South Atlantic yellow pine region d in the Pacific Northwest, by kiln-drying. This device, perhaps greatest of the more recent improvements in the methods of manu- cture, was introduced in 1867. Its use did not, however, become neral until within the past thirty years. Indeed, it has not been found eful in the seasoning of some species, despite the fact that its use nders the available supply more responsive[37] to the peculiar current nditions of the lumber market. Kiln-dried lumber is frequently mar- table within five days from the stump.

Improvements in the saws themselves have, however, been the ctors most responsible for the greatly increased capacity of the aver- e mill. By 1830 the circular or "rip" saw[38] had begun to find favor the United States. By the close of the Civil War most of the lum- r, especially the white pine of Michigan, was cut by it. But the ip" saw was very wasteful of material, cutting a kerf of from ⅜ to of an inch.[39] Gang saws were introduced into the manufacture of e higher grades of lumber where the minimization of waste was of eatest importance.[40]

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[36] In many sawmills all mill "waste" is utilized. The sawdust and trimmings e used as fuel; edgings and slabs are cut into sizes for manufacture into novelties. r the whole may be sent to a chemical plant for distillation. Such plants are casionally an adjunct to the sawmill. See Appendix V.

[37] For example, North Carolina pine can be prepared for shipment, dry, within ur days from the stump. Such species as northern pine, which are air-dryed, quire about nine months for seasoning. Use of the kiln-drying method of course minishes the stock which must be carried in yard to meet a sudden demand. For ample, the "normal stock"—percentage of the annual output—of southern mills is:

North Carolina, 15; loblolly and shortleaf pine.
Texas, 44; Louisiana, 38; chiefly longleaf pine.
Georgia and Florida, 13; chiefly shortleaf and loblolly pine.
Alabama, 23; longleaf, shortleaf and loblolly pine.

North Carolina pine is shortleaf and loblolly.

Because of their proximity to large markets Missouri mills cutting longleaf nd shortleaf pine, maintain a normal stock of 50 per cent. St. L. L., Jan. 1, 1910, 63.

White pine, 40 to 50; Douglas fir, 15; hemlock, 30; spruce, 20; cypress, 55. A. L., Statistical Summary, May 25, 1907, p. 5.

[38] Introduced in 1814 from England where it had been in use for several years reviously.

[39] In early white pine manufacture and in the West Coast mills before the eneral use of the band saw.

[40] Gang-saws consisted of a series of parallel "sash" saws: often 24 or 42 or ven more. They are often used to saw the merchantable lumber from logs which ave been trimmed or "slabbed" by a circular saw or by a band saw. Am. Rev. f Rev., Vol. XXXVI, 1907, p. 570.

The modern band saw now used in the best equipped mills was practically unknown to lumber manufacture in the United States prior to 1880. The economy of material[41] effected by its use forced its adoption by the white pine mills during the eighties when the industry in that region began to decline. It has, in recent years, supplanted the rotary saw in the large southern and West Coast mills. In the small mills and especially in the hardwood region the circular saw is still widely used. The improvements during the past forty years in the technological processes of all branches of lumber manufacture have been no less conspicuous than those which have characterized other great manufacturing industries.[42]

Development of the Individual Mill.

Number of mills. Despite the great relative increase in production during the past seventy years[43] there has been no considerable increase in the number of mills as compared to the increase in the total product. The census of 1840 reported 31,560 "lumber-mills," which sawed a product valued at $12,943,507 or at approximately $400 per mill. The following tabulation shows the changes recorded in the number of sawmills and in the total[44] capital invested in them, since 1850:

TABLE 3.

Year	Number of Establishments	Increase, Per Cent	Capital	Increase, Per Cent
1850	18,769	40.5*	$ 41,444,364	....
1860	20,659	10.1	74,530,090	79.8
1870	25,832	25.	143,493,232**	92.5
1880	25,708	0.5*	181,186,122	26.3
1890	22,617	12.*	557,881,054	207.9
1899	28,133	24.1	611,611,524	9.6
1904	25,153	10.6*	733,708,000	20.
1909	40,671	61.7	1,176,675,000	60.3

* Decrease. ** Expressed in depreciated (1/5) currency.

It is presumed that in some cases complete returns from small mills have not been recorded. The census of 1904 was a less exhaustive report upon the lumber industry than was that of 1909. Since, however, the omissions are undoubtedly of small mills only, the data on he capital invested are reasonably complete. Between 1850 and 1909 he number of mills increased 116 per cent[45] as compared with a coincident increase in capital invested of 2739 per cent. Thus the increase n the capital per mill since 1850 has been 1268 per cent; in physical output over 300 per cent.

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[41] The kerf is only about 1/16 inch or often less. As long as timber was cheap and plentiful the rotary saw was, despite its wastefulness, often preferred to the band saw. The latter is much more difficult to adjust. Fernow, B. E., American Lumber, p. 202.

[42] Ibid., p. 201; also, Business and Lumber Trade Conditions, Barnes, W. E., ed., No. 33, Nov. 18, 1914, pp. 2, 18.

[43] See supra, p. 25.

[44] As nearly as can be determined from the census reports these figures include all sawmills whether operated separately or in connection with planing mills or logging camps (or with both) and all independent logging camps. "Capital" includes the investment in dependent logging camps, sawmills and planing mills and independent logging camps. The data for 1899, 1904 and 1909 cover sawmills, shingle and lath mills, independent planing mills, logging camps, veneer mills and box factories. It has been impossible to isolate statistics of sawmills only. Without doubt also the changes in the methods of enumeration and of classification have diminished the absolute comparability of the figures given. Moreover no consistent definition of "capital" seems to have prevailed.

Increase in mill capitalization. The remarkable increase in the capital invested in the industry during the decade 1880 to 1890 was occasioned, among other causes, by the greatly increased use of expensive machinery and mill and woods equipment. Probably the most important factor, however, was the practice, among manufacturing interests especially in the South, of heavy bonding as a means to the purchase of standing timber. Much of the capital, therefore, nominally invested in the sawmills was really in stumpage. This period, moreover, marked the beginning of the shift of the industry from the Lake States to the southern pine belt as did also a similar period fifteen years later, the migration of capital to the Pacific Northwest. A large proportion of the southern and western mills are now heavily bonded. The customary security for such bonds has consisted of standing timber.

Average mill capacity. That the greater relative increase in average capitalization than in physical output has been due in part at least to the persistence of a great number of small mills is shown by the fact that 84.7 per cent of the mills produced only 22.5 per cent, and 70.8 per cent of the mills only 12.8 per cent of the total lumber cut in 1909. The average cut per mill[46] was made by only 15.3 per cent of the mills. The product of 84.7 per cent was under the average. In the following table the groups are classified according to output in 1909.

TABLE 4.

Mill group[47] (feet B.M.)	Lumber cut 1909, M feet	Per cent of total mills in group	Per cent of total cut 1909 in group
50 M, less than..........	124,966	9.7	.3
50 to 500 M............	5,582,738	61.1	12.5
500 to 1,000 M..........	4,315,636	13.9	9.7
1,000 to 2,500 M.........	5,996,043	9.	13.5
2,500 to 5,000 M.........	4,072,549	2.7	9.1
5,000 to 10,000 M........	5,291,606	1.7	11.9
10,000 to 15,000 M.......	4,078,988	.7	9.2
15,000 to 25,000 M.......	6,308,819	.7	14.2
25,000 to 50,000 M.......	6,238,229	.4	14.
50,000 M or over........	2,500,187	.1	5.6
Total	44,509,761	100.	100.

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[45] Between 1840 and 1909, 28.9 per cent. It may be noted that the growth of the lumber industry since 1850 has been due to no considerable increase in the territory of the United States.

[46] See supra, p. 36; i. e., from 266.4 M feet in 1850 to 1094.4 M feet in 1909.

[47] The Lumber Industry, Pt. I. p. 34.

The Emerson mill, the "crack" mill of the West, built in Saginaw in 1835, had an annual mill capacity of 3 million feet.[48] The average output per mill on the Saginaw River was 2.6 million feet in 1854; 2.7 million feet in 1857. In 1870 it had increased to 7 million and in 1881, the period of maximum production in that region, to 13.9 million feet.[49] These were then the largest and best equipped mills in the United States. In 1909, 33.8 per cent of the total output was manufactured in 1.2 per cent of the mills, each having a larger annual product than had the best Michigan mills in 1881. The average for these mills was 27.4 million feet in 1909, or approximately twice that of the Saginaw Valley mills in their prime.[50]

In thirty years there has developed no tendency indicating any economy inherent in the concentration of lumber manufacture in very large mills. An increase beyond 20 or 25 million feet a year in the capacity of a sawmill has not increased the economy of adjustment of the different productive factors.[51] There has been, moreover, the certain disadvantage of a long log haul in providing the mill with raw material. That maximum productive efficiency, all factors considered, has been secured in mills of moderate size, is reflected in the common practice among owners of large tracts of timber, of building a number of mills in preference to concentrating manufacture in a single great mill.

This is the prevailing policy among the owners and manufacturers of yellow pine. It is but little less characteristic of the lumber industry in the Pacific Northwest. In this condition, prevalent in the industry, lies the explanation of the concurrent operation at strategic points, of scores of mills manufacturing the same kind of lumber, many often under the same or associated managements.[52]

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[48] Saginaw Valley Statistics for 1881, Cowles, E., ed., pp. 2, 3. This was the first white pine mill to enter into commerce in lumber.

[49] Annual Review of the Manufacture of Lumber and Salt in the Saginaw District, 1882, p. 8; same 1881, p. 3.

[50] See supra, p. 31.

[51] The Lumber Industry, Pt. I, p. 35.

[52] Ann. Rev. Sag. Dist., 1881, p. 3.

CHAPTER III.

ORGANIZATION OF THE LUMBER INDUSTRY: DISTRIBUTION.

Competition Between Species of Lumber.

Different species of lumber are often adapted to identical uses. In all such cases the scope of potential competition between them is unlimited. Physical properties are the chief determinant of available uses. For certain purposes many species are adaptable; for others only one. Thus for framing and for rough construction, fir, western pine, yellow pine, North Carolina pine, hemlock, spruce and northern pine are physically qualified.[1] Interior finish also permits of the use of a wide range of species. In general construction work and in sash, door, blind, and general millwork, both softwoods and hardwoods are employed, the former greatly predominating. Low grades of several species, especially of northern pine, are used in the manufacture of boxes and crates.

Hardwoods predominate in the furniture industry. Yellow pine, fir and white oak enter most extensively into car construction. The miscellaneous wood-using industries use large aggregate quantities of lumber, chiefly of hardwood. Competition is often keen also between lumber of the same species from different sources. For example, Lake States hemlock has, in recent years, invaded the Buffalo and Erie Canal markets, practically driving out the Pennsylvania stock.[2] In turn western hemlock, an allied species of similar physical properties, had by 1909 expelled the Lake States stock from many of the same yards.[3]

Aside from the questions involved in their geographical distribution, it is apparent that different species, of similar physical qualities, have actively competed for the majority of important uses to which lumber has been devoted.[4] There has been therefore a wide range of potential, as well as of actual, substitution of one species for another.[5]

The Lumber Markets.

The territory tributary to any given source of lumber supply during the past fifty years is capable of only general definition. It has been shown that local production for local distribution was generally characteristic of the lumber industry before the Civil War.[6] The white pine region thereafter became, for thirty years, the center of supply for the eastern and central markets. It also furnished a very large proportion of the lumber used in the building up of many of the prairie states. During this period the Lake States were conspicuously and characteristically the producers of a surplus of lumber intended for distribution in those states in which domestic supply was inadequate. This inadequacy in some regions was due to the almost total absence of standing timber. Much more frequently, however, especially in the eastern and central markets, it was due to the exhaustion of the local supply of timber of the particular quality then demanded. Thus the original demand for foreign lumber, i. e., lumber from a distant region, has been for the high grades[7] which could not be produced at home.

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[1] Lumber for these uses constitutes more than one-half of the current annual output; with the addition of planing mill products, nearly three-fourths. For. Prod., 1911, p. 3; Kellogg, R. S., op. cit., pp. 168, 169.

[2] A. L., Oct. 24, 1903, p. 57; same, Nov. 28, 1903, p. 61.

[3] N. Y. L. T. J., Sept. 15, 1909, p. 31.

[4] M. V. L., Apr. 6, 1906, p. 34; same, Nov. 1, 1907, pp. 34, 35; western pine, fir, southern pine, northern pine. A. L., Oct. 14, 1905, p. 65; same, Dec. 23, 1906, p. 66; same, Aug. 22, 1905, p. 65; fir, yellow pine, cypress, white pine. N. O. L. T. J., Apr. 15, 1907, p. 41; southern pine, fir, northern pine. N. Y. L. T. J., Aug. 1, 1902; white pine, because of long standing prestige, preferred to poplar and red cedar, "in every way as good for the purpose," which could be bought at several dollars less per M feet (Buffalo).

[5] The uses for lumber here enumerated are from the files of the Division of Wood Utilization of the Forest Service.

Reference to Diagram 5 will show that, during the sixties and seventies, the white pine industry was rapidly developing in the face of a decline, equally rapid, in lumber production in the East. At no time can it be said of any particular region of the United States (except of such as have produced no lumber at all) that it has been supplied wholly by lumber of a given source. Domestic production has been capable usually of supplying certain local demands, especially for inferior grades. But for the bulk of the medium grade and for practically all the high grade lumber, the great consuming regions have now become dependent upon shipments from more and more distant sources. The exact changes in the degree of this dependence, in the chronology of the past fifty years, cannot be determined since, until recent years, no continuous records of shipments have been kept. That the centers of lumber production, however, have continuously receded from the centers of population, indicates that the degree of dependence upon foreign sources has been of constant growth.

Relation of Wood-using Industries to Sources of Supply.

As the relative scarcity of timber has increased, the demand upon the surplus of other regions has extended itself to lower and lower grades. The growth of the lumber industry in the Lake States was accompanied by the development of other interests which gradually absorbed the low grade lumber which could not have been profitably sent to distant markets. Thus have grown up many of the wood-using industries of the Lake region and of neighboring centers which have been reached by cheap means of transportation. The furniture industry has become centered in Grand Rapids, within the hardwood belt of the Lower Peninsula of Michigan. Chicago has become the home of great wood-using factories to which lumber of all grades was formerly sent from the northern mills by cheap water transportation.

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[6] See supra, Extent of Lumber Manufacture, pp. 27 to 30.

[7] The nature of this demand for the higher grades only for shipment to distant markets has been the cause among manufacturers, of utilizing only the best portions of the tree and of the log and of leaving the rest in the woods or of discarding it as mill waste. Much unreasonable public complaint has been thrust at this practice, which has characterized, at certain periods, the manufacture of lumber in all the regions (e. g., Lake States; Pacific States) which have produced a surplus for shipment to other territory. The same method has been practiced at all times in certain regions which are disadvantageously located or which are unusually inaccessible to the market. It is obvious however that as long as the manufacturer cannot profitably market low grade lumber, it is uneconomical for him to manufacture it. Provided that he makes reasonable provision, as is now usually done, for the diminution of waste, the public question involved is not in fairness, whether or not such producer should manufacture only the higher grades of lumber, but whether, on account of the unfavorable conditions of his operations, *he should manufacture lumber at all.* The availability at present, however, of any means of interference with such manufacture, is not apparent.

MARKET FOR LOW GRADES.

Many of the older sections on the other hand have continued to supply themselves with low grade lumber. "Old-field pine" in Virginia, a second growth on plantations discarded during the Civil War, now furnishes a great deal of material for the manufacture of boxes and crates. In this industry Virginia surpasses all other states.[8] In New England second growth white pine has been found adequate in quality to meet the less exacting requirements for lumber for inferior uses. It has moreover proven itself reasonably remunerative to investment.[9] Domestic production has likewise continued to supply a considerable proportion of the local demand in the northern tier of the Central States. The softwood lumber consumed in this territory has however come from foreign sources, chiefly from the Lake States and from the South.

Development of Lumber Industry in the South.[10]

As the surplus of the white pine region began to decline during the eighties and the early nineties and as the prices of lumber showed a relative advance in response to the influence of increasing scarcity of supply, southern pine began to replace the higher grades of northern lumber in the eastern and central markets. Previous to 1880 North Carolina pine had been manufactured almost exclusively for local consumption.[10a] It had then acquired an uncertain foothold in the Baltimore and Philadelphia markets. Its first appearance in the New York yards was in 1886. This new outlet gave a great impetus to lumber manufacture in Virginia and the Carolinas.[11]

EXTENSION OF MARKET FOR SOUTHERN YELLOW PINE.

During this period also, yellow pine from the Gulf States entered the central markets in competition with lumber from the North. High grades only were then capable of absorbing the relatively heavy transportation costs.[12] As the supply of northern pine continued to decline an increasing stock of yellow pine lumber of high—and later of medium—grade entered the market. Gradually the limits of the territory tributary to the northern mills have been driven northward. Yellow pine is now to be found in the yards of northern Iowa.[13] It has entered even the Lake States themselves; it constitutes, with North Carolina pine, the chief supply of the eastern markets. In addition, the domestic demand for all grades is met almost exclusively by domestic production. Thus southern lumber, since the eighties, as far as transportation costs have permitted,[14] has invaded and in large measure appropriated territory previously supplied by northern pine.

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[8] Smith, J. Russell, Industrial and Commercial Geography, 1913, p. 436. Virginia consumes more than 400 million feet of lumber annually in the manufacture of boxes and crates, or nearly 10 per cent of the total consumption for this purpose.

[9] Cook, H. O., Forest Mensuration of White Pine in Massachusetts, 1911, pp. 20-22. In 1912 white pine lumber manufactured in New England constituted 22.2 per cent of the total cut in the United States. For. Prod., 1912, p. 15.

[10] The lumber industry was early developed in the South, where it was closely associated with the production of naval stores. For many years it led all other regions in the exportation of lumber. During the Civil War and the reconstruction period, the industry greatly declined. Defebaugh, op. cit., Vol. I, p. 474.

[10a] A. L., Oct. 19, 1907, p. 45.

[11] Same; June 1, 1907, p. 31. The North Carolina pine region includes Virginia and the Carolinas.

West Coast Lumber.

Lumber manufacture in the Pacific Northwest has been greatly stimulated by the reductions, conceded in 1894 by the western railroads, in the transcontinental freight tariffs on lumber. By 1900 western white pine from the "Inland Empire" had found a ready market in the Middle West in place of northern pine.[15] Between 1902 and 1905 cargoes of fir lumber of high grade and large dimensions entered the New York market. By 1906 fir timbers were there a confirmed substitute for southern pine.[16] As early as 1899 cargoes of fir flooring had reached Boston, because of the high prices prevailing there of maple and of yellow pine stock.[17] By the period of maximum prices in 1906 and 1907 high grade fir was shipped in considerable quantities to the eastern markets. It had secured a reasonably secure footing, by 1909, in the Buffalo market.[18] For many years previously fir had been a strong competitor in the Chicago market, with yellow pine as a material for car construction.[19] Because of the relatively light transportation costs however the southern lumber had a strong advantage. Indeed when, after the panic of 1907, the price of yellow pine suffered a tremendous decline, the market for western lumber in territory east of the Mississippi River was practically wiped out for a time.[20]

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[12] It should be noted that there has been no classification of the freight tariffs on lumber. Shipments are made on a commodity rate per 100 pounds. No distinction is made in the charges for differences in the grade or the value of the stock. The cost of transportation absorbs therefore a greater proportion of the selling price in the consuming market, of the low grade than of the high grade lumber.

[13] In 1907 southern lumber constituted four-fifths and West Coast lumber one-fifth of the supply at Lincoln, Nebraska. 13 I. C. C. Rep. 319.

[14] Even today only a comparatively small amount of low grade yellow pine lumber crosses the Ohio River. As noted above, inferior stock is supplied from domestic sources or from the North which is still able to meet the less exacting demands. See 206 U. S. 428.

[15] Western white pine "will continue to take the place of northern white pine as fast as the output of that product shall decrease." A. L., Jan. 25, 1900; Spokane notes.

[16] Southern pine stock in similar sizes was becoming scarce.

[17] N. Y. L. T. J., Nov. 1, 1899, p. 16.

[18] The rate per 100 pounds from the Pacific Coast to Buffalo was 70 cents or about 21 dollars per M feet on fir timbers S4S, the weight of which averages 3,000 pounds. Standard List B, Pacific Coast Forest Products, 1913, p. 6. The rate to New York or to Boston was 75 cents; to Chicago, 60 cents, as compared to a rate to Chicago of from 22 to 25 cents from the yellow pine region.

[19] A. L., Oct. 25, 1902, p. 50.

Invasion of Eastern Markets.

Washington red cedar shingles have recently acquired an almost nation-wide market. About the year 1904 they first invaded the Eastern Central States.[21] Five years later they were securing most of the trade in that region, and were, moreover, competing, apparently on equal terms, with cypress shingles in the Southern States themselves.[22] In 1912 nearly 79 per cent of the shingles manufactured in the United States were of red cedar from the Pacific Northwest.[23] Thus within but little more than a single decade West Coast lumber had acquired a practically nation-wide market for high grade stock.

The consuming territory dependent upon the western mills for the bulk of its supply of all grades, has been extended eastward beyond the Missouri River and southward to western Kansas. Competition between the three great centers of lumber production is at present very keen in Iowa and in eastern Nebraska, a territory to which all have access. Western lumber has tended to push the limits of its tributary markets east and south. The market for southern pine has extended north and east.[24] The competition of southern and western mills has now confined the distribution of northern lumber to a relatively narrow range.[25]

Hardwoods.

A report of the Northern Hemlock and Hardwood Manufacturers' Association in 1910 showed the following distribution of the product of its affiliated mills. The range described is undoubtedly typical of the product of this region.

Hemlock: Chicago, 19 per cent; Illinois (except Chicago), 9 per cent; Minnesota, 8 per cent; Iowa, 8 per cent; South Dakota, Nebraska, Missouri, Indiana, Michigan, Ohio, Eastern States, 23 per cent. Consumed in Wisconsin, 33 per cent.

Hardwoods: Chicago, 29 per cent; Illinois (except Chicago), 8 per cent; Minnesota, 11 per cent; Iowa, South Dakota, Nebraska, Missouri, Indiana, Michigan, Ohio, Eastern States, 22 per cent. Consumed in Wisconsin, 30 per cent.

Distribution of Hardwood Product.

An investigation of four years duration, conducted by the Hardwood Record, has shown that the consumption of hardwood lumber in the

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[20] St. L. L., Jan. 1, 1909, p. 44; i. e., with the exception of extra wide and long lumber which can be secured only from the western woods.

[21] A. L., Sept. 10, 1904, p. 42.

[22] N. O. L. T. J., Oct. 15, 1909, p. 41; same, Nov. 1, 1909, p. 42.

[23] Dept. of Commerce, Special Rep. on Lumb. and Shing. Ind. in State of Wash., 1914, p. 9.

[24] Am. Rev. of Rev., Vol. XXXVI, 1907, pp. 566, 567.

[25] High grade white pine, of which little is now manufactured, continues to have an extensive market. For certain uses no other species has been found a satisfactory substitute.

United States has been greatly concentrated. Of the total output of hardwood lumber in 1910 of over 8 billion feet, 85 per cent was sold in seven contiguous states.[26] In the form of products further manufactured for special uses, this proportion has, of course, had a much wider distribution. The distribution of hardwood lumber has not been subject to those influences which have determined that of softwood lumber. This difference has been due to two important conditions. There has been but one great source of hardwood supply, i. e., the central region. Hardwood lumber, without further manufacture for specialized uses, has had a relatively limited range of uses. It may be said to constitute, in general, a stage in the manufacture of wooden articles rather than a finished product in itself. About ninety-five per cent, on the other hand, of softwood lumber, either rough or dressed, is utilized without additional manufacture.[27]

Distribution of Lumber for Factory Uses.

Higher Grades. Wood-using industries dependent upon lumber of a particular species or quality have created and fostered a market for such wood despite the continued recession of its production from centers of manufacture. Such industries have tended to continue in operation in close proximity to their consuming territory. The furniture industry, long established in the Lower Peninsula of Michigan, now secures from other states nine-tenths of its oak lumber and five-eighths of its entire supply of all species.[28] In general the location of factories using lumber for high grade uses has been adjusted to the easy marketing of the product rather than to cheap access to raw material.[29]

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[26] New York, Pennsylvania, Ohio, Indiana, Illinois, Michigan, Wisconsin. These states are centers of wood-using industries. The recent studies of these industries by states [see infra, note 29] indicate a marked tendency toward the concentration near consuming markets of the manufacture of hardwood for special uses.

[27] In general building and construction, including mill-work; in the manufacture of boxes and crates and in car construction. Kellogg, R. S., Lumber and Its Uses, pp. 168, 169.

[28] For. Ser., Wood-Using Industries of Michigan, 1912, p. 31.

[29] For. Ser., Wood-Using Industries of Massachusetts, 1910, pp. 8, 9.

The percentage of lumber used in furniture manufacture, which has been produced outside of the state, has been:

Wisconsin, 45; Wood-Using Industries, 1910, p. 28.
New Hampshire, 45; Wood-Using Industries, 1912, pp. 59, 62.
Vermont, 34; Wood-Using Industries, 1913, pp. 69, 70.
Connecticut, 72; Bull. 174, Connecticut Agricultural Experiment Station, 1913, p. 27.
Maryland, 96; Wood-Using Industries, 1910, p. 21.
Virginia, 30; Wood-Using Industries, 1912, p. 48.
California, 74; Wood-Using Industries, p. 50.
Tennessee, 35; Southern Lumberman, May 25, 1912, p. 44.
Texas, 12; The Lumber Trade Journal, June 15, 1912, p. 37.
Missouri, 67; St. Louis Lumberman, Mar. 15, 1912, p. 74.
Kentucky, 22; Wood-Using Industries, p. 37.

In sixteen states, including Michigan, North Carolina, Illinois and Wisconsin, the leading furniture-producing states, 67 per cent of the lumber of the seven chief species used in furniture manufacture, was of oak (1912).

Note: The studies of the secondary wood-using industries of the different states, above cited, have been made under the supervision of the Forest Service from which copies may be secured.

Lower Grades. The manufacture of low grade lumber, in the wood-using industries, on the other hand, has been confined to material originating in nearby sources. For this purpose the location of the industry has tended to become adjusted to the need of cheap access to the raw material. The centers of the box and crate industry, utilizing one-tenth of the annual lumber cut[30] are distributed in regions to which the supply of low grade material—chiefly softwood—is readily available.[31] Thus Michigan secures less than three-tenths of the box material currently used, from points outside of the state; Wisconsin one-fourth and California one-fifth. Virginia, in which the manufacture of boxes and crates is estimated to exceed that of any other state,[32] despite cheap access to abundant low grade lumber from North Carolina and Tennessee, uses more than three-fifths of lumber of domestic production. Box lumber secured from distant sources of supply has been usually high grade stock designed for permanent use. The principle is illustrated in the statistics of wood-using industries of California, a state almost destitute of hardwoods. Its factories have imported hardwood lumber from the East in large quantities. Low grade softwood, on the other hand, has been either produced within the state or accessible at low cost by cargo from Oregon and Puget Sound.[33]

Complete isolation of general phenomena relative to the distribution of lumber of low grade has been difficult if not impracticable since most of the states concerning whose wood-using industries data are available, are themselves the producers of low grade but, in general, not of high grade lumber. The evidence has shown, however, the historical tendency toward the concentration near consuming centers of industries manufacturing a product of high grade, irrespective of the source, whether distant or close at hand, of the supply of the constituent raw material; and a much closer adherence to the sources of supply of industries using inferior grades of lumber. Low grade lumber of a given origin has not, in general, reached distant markets. Thus interstate or interregional commerce in lumber has consisted chiefly of the high and medium grades. The market price of low grades has usually been insufficient to absorb the costs of transportation from distant sources.

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[30] For. Prod., 1911, p. 3.

[31] Quoting the sources of note 29, supra, the percentage of box and crate material secured from sources outside of the state has been:

New Hampshire, 44; p. 42.
Vermont, 60; p. 61.
Connecticut, 78; p. 21.
Maryland, 72; p. 15.
Tennessee, 26; p. 43.
Texas, 14; p. 37.
Missouri, 73; p. 72.

The bulk of the box lumber used in Vermont and Connecticut is low grade softwood from Maine. Loblolly pine from Virginia constitutes the chief supply of Maryland (p. 15). Missouri secures box lumber from as great a distance as Washington and California. This is due to the character of the industry, the output of which consists to a large extent of piano boxes, tool boxes, beer crates and others, designed for permanent use.

[32] Wood-Using Industries of Virginia, 1912, pp. 36, 38.

[33] Wood-Using Industries of California, p. 21.

Divisions Within the Lumber Industry.

In the classification of functions within the lumber industry the following have been distinguished:

First, the ownership of standing timber.
Second, logging.
Third, manufacture of lumber.
Fourth, wholesale distribution.
Fifth, retail distribution.

THE OWNERSHIP OF STANDING TIMBER.

The ownership or control of stumpage has been generally but not necessarily a condition of lumber manufacture. Most manufacturers have owned their own stumpage.[34] Others have bought logs delivered at the mill. Large quantities of timber also have been withheld from the saw with deliberate view to higher future prices.[35] That the recent tendency toward the consolidation of extensive tracts into single holdings has become an important potential influence in the industry is discussed in a subsequent chapter.[36] The control of stumpage involves the potential control of lumber manufacture through the control of its raw material.[37] It is generally recognized by the lumbermen as having been the great source of profit in the industry, rapidly absorbing any increase in the prices of lumber.[38]

LOGGING.

The felling of standing timber; its division into suitable lengths for the sawmill; its delivery by rail or by river drive to the mill, has been a distinct industry in many regions. The majority of manufacturers have their own woods "crew"; others let a contract to logging companies. Such companies have been prominent in the industry on the Pacific Coast.[39] In the early period when logs were delivered to the mill almost exclusively by water, timber owners frequently surrendered their logs at the river bank, to companies of river "drivers," for delivery "in the water," i. e., at the mill. In the eastern forests of the United States, where delivery is usually necessarily by rail, this custom no longer prevails.

Selling Agencies. Central agencies for the selling of logs or lumber have, at times, been a conspicuous part of the distributive mechanism in many regions.

"The success which has attended the establishment of selling agencies, formed to distribute the product of manufacturers similarly located"[40] has led to such associations among the manufacturers of southern cypress and later among those of sugar pine, redwood, fir of Southwest Washington, hemlock and maple. In 1904 was organized the Washington Logging and Brokerage Company which then controlled sixty per cent of the fir log output of the state.[41] There have been many organizations among the loggers of the Pacific Northwest.

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[34] A. L., Nov. 12, 1910, p. 79.

[35] The Lumber Industry, Pt. I, p. 36.

[36] See infra, pp. 61, 62.

[37] The Lumber Industry, Pt. I, pp. 37, 38.

[38] The owner of extensive timberlands in Minnesota and in the Pacific Northwest, in referring to "a mistaken belief that the manufacture of lumber is a profitable business," added that "the wealth of the lumberman has been made by an increase in the value of his timberlands." A. L., Nov. 12, 1910, p. 79.

[39] The Timberman, Mar., 1907, p. 67; A. L., Mar. 30, 1907, p. 132.

[40] A. L., Feb. 13, 1904, p. 17.

MANUFACTURE OF LUMBER.

The manufacturer of lumber has frequently exercised all the functions within the lumber industry. He has owned, cut and manufactured his own timber. In addition he has often distributed his own product. As a manufacturer, however, his activities have been confined to the production of lumber from the raw material, logs. Only partially applicable to the lumber industry is the customary triple classification of distributive mechanism, i. e., into manufacturer, wholesaler and retailer. For example, one-third of the product of yellow pine lumber is sold direct to large consumers such as the railroads and construction companies. The rest is sold to wholesalers, brokers and retailers; most of it to the retail yards direct. This type of mercantile organization has prevailed also in the marketing territory tributary to the mills of the Pacific Northwest.[42]

"Line-yards." Many manufacturers have operated wholesale and retail yards. In the softwood lumber trade the wholesaler, as such, has become relatively unimportant; in the hardwood trade he is the chief distributive agency.[43] Most of the producers who have discharged multiple functions are manufacturers of softwood. Some have owned as many as one hundred retail yards distributed throughout their marketing territory. Especially in the Middle West had the retail trade, by 1907, fallen, to a large extent, into the hands of "line-yard" companies.[44] These sold more than one-half of the lumber, chiefly of softwood, which was consumed within their spheres of influence.[45] The economy of these organizations is obvious in:

First, buying lumber in great quantities, almost invariably at a reduced price.

Second, auditing of accounts.

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[41] Same, Feb. 25, 1905, p. 69.

[42] Especially in the "treeless" states of the Middle West.

[43] The predominance of any of the three distributive agencies has been determined chiefly by the conditions of the manufacture of the lumber. Lumber manufactured from almost pure stands, i. e., of one species only; manufactured by mills of large capacity, which confine their output chiefly to a single species, usually goes to the retailer or to the consumer direct. But lumber produced from mixed stands, i. e., of several species,—this is characteristic of hardwood manufacture—by mills of small capacity, is usually marketed through the wholesaler who secures the product of a large number of mills. A large proportion of the lumber so handled goes direct from the wholesaler to the large consumer.

[44] Includes all companies operating three or more retail yards.

[45] Am. Rev. of Rev., Vol. XXXVI, 1907, p. 574. In 1907, out of the one hundred and fifty "line-yard" companies operating in Minnesota and in the Dakotas, fifty had headquarters in Minneapolis. Some owned as many as one hundred yards. Forty was not an unusual number.

Third, affording more skillful average management.

Fourth, the influence of strong combined financial support and solidarity, tending to steady the retail market.

Historically the timber-owning manufacturer has ruled the industry. To this rule there have been many specific but no general exceptions. The recent relative scarcity and the resultant higher prices of stumpage have tended, however, to subordinate the manufacturer, as such, to the owner of timber, his raw material.

WHOLESALE DISTRIBUTION.

Distributing markets have been evolved as a result of the dynamic changes in the geography of lumber production. Bangor, Albany, Burlington, the Tonawandas, Chicago and Minneapolis have been successive centers of white pine distribution. In Memphis, Nashville, Cincinnati and Chicago has become centered a large proportion of the wholesale hardwood trade. Chicago now receives lumber from the North, northern pine; from the South, southern yellow pine; and from the West, fir and western pine.[46] In the softwood lumber trade of the West and South, "basing points" in strategic locations have, to a large extent, taken the place of wholesale centers. New Orleans for cypress; Norfolk for North Carolina pine; Savannah, Jacksonville, Hattiesburg, Beaumont and Houston for southern yellow pine, have been typical in their respective regions. Portland and Puget Sound cities for fir; Spokane for western pine; Minneapolis for northern pine; Wausau for Lake States hemlock, have become important "basing points."

As the source of lumber supply has changed the distributive mechanism has gradually adjusted itself to the demands of economy in the transportation of the product to consuming territory.[47] Since lumber is very heavy in proportion to its value, differences in the cost of transportation to market are of great importance. The geographical distribution of wholesale centers has been determined chiefly by the demands of economy in transportation.

Associations of Wholesalers. With the many organizations of wholesalers this study has but little concern. As lumber distributing agents they have been, as a rule, of comparative unimportance. Of these the National Wholesale Lumber Dealers' Association has been the most prominent. Its attempts at the classification of "legitimate" trade and at the regulation of prices are discussed in a later chapter.[48]

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[46] An interesting condition has accounted for the ability of three widely separated sources of supply to compete for the Chicago—and for the middle western markets. Northern pine stumpage is now high in price and relatively inaccessible; the transportation rates—cargo or rail—are low. Yellow pine timber is cheaper and more accessible, by logging railroad. Freight rates are higher, i. e., 26 cents per 100 pounds and the lumber is heavier per M feet. Fir stumpage is much cheaper; much of it is accessible to cheap logging methods. The cost of transportation is high—50 cents from Western Washington—but the lumber weighs less per M feet, on the average, than does yellow pine.

The fact should not be overlooked, however, that from another point of view accessibility to the market has largely determined stumpage prices. To say that stumpage prices determine ultimately the extent of the market for lumber of a given origin, is to confuse the cause with the effect. On the other hand "accessibility" as used in the present statement, refers not to accessibility to *any one particular market*, but to any markets capable of absorbing the product at a net price as great or greater than can be secured for it in any other market.

[47] McPherson, L. H., op. cit., pp. 134ff.

RETAIL DISTRIBUTION.

Lumber used for building and as raw material for the manufacture of wood products, where small quantities are consumed, has been usually handled by the retailer. As long as the construction of frame buildings continues, this division of the lumber distributing agencies cannot but be important. On the other hand large wood-using factories have tended to buy from the mill direct or from the wholesaler.[49]

In large cities a comparatively small number of yards have handled the retail business. Lumber for the construction of buildings finds there a sale limited by the increasing use of steel, stone and brick and by strict building regulations. Much of the local trade has therefore been confined to dealing in miscellaneous stocks.

Associations of retailers. The associations of retailers have been usually limited to intra-state activity. They have frequently endeavored to delimit the territory tributary to each retail yard and to prevent any transgression of the lines by rival shippers. In defining a "legitimate" retail yard they have often "blacklisted" as "unfair" any wholesaler who has sold to the consumer direct or to a yard not classified as "legitimate."[50]

Local retail organizations covering one or more counties have been not uncommon. Before the anti-trust laws were rigidly enforced such associations often divided the rural territory among the towns.[51] Scales of prices were instituted and often strictly observed. In at least one large western city the retailers jointly fixed prices and deposited a guarantee to "play fair." A hired secretary kept watch. Any member found cutting list prices was heavily fined. This practice, to a large extent, has been broken up by the activities of anti-trust investigating committees. The restriction of local competition by price agreements and by the division of territory has existed, in the United States, in all degrees of intensity. Ranging from no restraint to virtual pooling, the competitive conditions in the retail distribution of lumber have varied according to peculiar conditions in the local trade, to the disposition of the dealers and to the activity of prosecuting officers.

Organizations of Manufacturers.

The power of the manufacturer has extended to every branch of the lumber industry. His control of stumpage has given him a large measure of control over the production of lumber. His assumption of the functions of the wholesaler, especially in the softwood trade, and his frequent operation of retail ("line") yards have greatly strengthened his influence over the distribution of lumber. In the South, but to a much greater extent in the Pacific Northwest, large corporations own great forests of merchantable timber; operate large mills; ship their lumber in their own schooners to wholesale or retail yards, which they either own or control. They have thus secured the profit at every stage of manufacture and distribution from the stump to the consumer.

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[48] See infra, Ch. VII, p. 141.

[49] Especially car construction companies; makers of vehicles, implements and fixtures; shipbuilders and box factories.

[50] Thus a farmers' co-operative yard has often been "blacklisted." The opposition of the retailers has been particularly keen to the so-called "supply" houses which have advertised lumber at less than retail prices.

[51] Thus a farmer within the territory assigned to town A could not go for lumber to town B without being quoted such prohibitive prices that he would be forced to buy in town A.

Manufacturers have many common interests. Certain forms of joint action have therefore been evolved. Lumber exchanges in both producing and distributing centers; boards of trade[52] in manufacturing regions and numerous ephemeral organizations have been, for half a century, a part of the mechanism of the industry. They have developed with the growth of inter-regional commerce in lumber.[53]

Early Permanent Association.

Purposeful joint activity among manufacturers resulted in a permanent organization, in 1888,[54] of the white pine producers of Minnesota. A second association, of Wisconsin white pine producers, appeared in 1893. Since that time similar organizations have been formed in every important lumber producing region. The first organization of yellow pine manufacturers was the Missouri and Arkansas Lumber Association (1883), merged in 1890, into the Southern Lumber Manufacturers' Association. This became, in 1906, the Yellow Pine Manufacturers' Association, representing one-tenth of the total annual output of lumber in the United States. The Southwestern Washington Lumber Manufacturers' Association, organized in 1900; the Pacific Coast Lumber Manufacturers' Association (1901), and the Oregon and Washington Lumber Manufacturers' Association (1905), were consolidated, in 1911, to form the West Coast Lumber Manufacturers' Association.

Extent of Organization.

It was estimated in 1904 that more than three-fourths of the lumber shipped, during that year, from Oregon and Washington fir territory, came from association mills.[55] The Carolina Pine Lumber Association (1888) was succeeded,[56] in 1889, by the North Carolina Pine Lumber Company, which represented one-half of the total pine production in its territory.

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[52] The Saginaw Board of Trade, for example, was long an influential factor in the Michigan white pine industry. It kept an annual record of production, shipment and stock on hand; and of prices of both white pine lumber and stumpage.

[53] The development, during this period, of long distance commerce in lumber was the occasion of joint action for certain purposes among manufacturers, in the same territory, producing lumber of the same species and competing in common markets. These organizations were usually, however, only local and temporary.

[54] This was the beginning of the Mississippi Valley Lumbermen's Association, formally organized in 1891 and consolidated, in 1906, with the Wisconsin Valley Lumbermen's Association (1893) to form the Northern Pine Manufacturers' Association. The membership of this association now controls about nine-tenths of the output of northern pine in its territory, Northern Minnesota.

[55] Opinion of the secretary of Pacific Coast Lumber Manufacturers' Association.

[56] A. L., Aug. 17, 1907, pp. 45ff.

In 1905 its successor, the North Carolina Pine Association (1897), absorbed the South Carolina Lumber Association. Over 40 per cent of the annual output of North Carolina pine is now controlled by the members of this association. The tendency of the organization of lumber manufacturers has clearly been toward a diminution in number and toward an increase in the size and relative influence of the associations.

Minor species. The same tendency has been shown in the history of the manufacture of other less important species. The Northwestern Hemlock Manufacturers' Association[57] (1894) was merged, in 1910, with the Hardwood Lumber Manufacturers of Wisconsin, to form the Northern Hemlock and Hardwood Manufacturers' Association. [Hemlock and hardwood have been usually manufactured by the same mills.] In 1909 the Spruce Manufacturers' Association succeeded a number of informal loose organizations of West Virginia producers.[58] The Southern Cypress Manufacturers' Association, organized in 1905, was the successor of the Southern Cypress Lumber Association, organized in the early nineties; the Southern Cypress Co., Ltd. (1898) and its immediate successor, the Southern Cypress Lumber Selling Co., Ltd. (1901). This association, through its membership, controlled, in 1912, 51 per cent of the total cypress output of the United States and 78 per cent of the product of Louisiana.

Hardwoods. The Hardwood Manufacturers' Association of the United States (1902) absorbed, in 1902, the Yellow Poplar Lumber Manufacturers' Association (1892); and in 1906 the association of the manufacturers of hardwood dimension lumber. This is now the largest organization of hardwood producers. Its members control one billion feet of annual output or about one-twelfth of the total production of hardwood lumber. The National Hardwood Lumber Association (1898) is composed of manufacturers, wholesalers and large consumers. It has a present membership larger than that of any other association of hardwood manufacturers.

Among the minor organizations have been the

Michigan Hardwood Manufacturers' Association, whose members now produce about 700 million feet annually;

Wisconsin Hardwood Lumbermen's Association, representing, in 1903, a product of 225 million feet;

Oak Flooring Manufacturers' Association (1909), controlling about 65 per cent of the annual product of oak flooring.

The activities of the associations of hardwood manufacturers have been devoted chiefly to a comparatively futile effort to establish uniformity in grading practice in the hardwood market.

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[57] The Timberman, May 1, 1897, p. 21.

[58] N. Y. L. T. J., Jan. 15, 1909, p. 33; St. L. L., May 15, 1909, Pittsburgh.

PURPOSES OF ASSOCIATION.

Southern Yellow Pine. Among the yellow pine manufacturers association activity has been devoted to

1. Promotion of uniformity in methods of manufacture and terms of sale of lumber.

2. Dissemination, among members, of information concerning the production and shipment of lumber; the state of the market; general business conditions.

3. Issuing, or securing the issuance of, price lists for the membership.

4. Promoting the restriction of output in periods of depression and of low prices.

West Coast Lumber. The constitution of the Southwestern Washington Lumber Manufacturers' Association (1900) stated its object to

> "secure a full understanding of the conditions surrounding the lumber market; the establishment of uniform rules for grading and manufacturing; the establishing of uniform rates and prices; and for the purpose of carrying out such other measures as may be deemed for the welfare and in the interests of the manufacturers of lumber."

The interests of the Pacific Coast Lumber Manufacturers' Association (1906) covered a wide range. The two main purposes of its organization were to secure higher prices and to establish uniform grading practice.[59] But its activities extended also to problems of rail transportation and of lumber distribution; tariff revision; extension of markets; dissemination of statistics; political activity in reference to lien laws and workmen's compensation legislation; adoption of uniform terms of sale; prosecution of a vigorous campaign to create a market for odd-length lumber (in order to reduce waste at the mill).

The activities of the Oregon associations were co-extensive with those of others in fir territory.

Northern Pine. The purposes of the Northern Pine Manufacturers' Association were

> "The establishment of uniform grades for the inspection of lumber as the only legitimate basis for more nearly uniform prices."[60]
>
> The recommendation, by the "Price List Committee," of "such a basis of price for lumber as in its judgment the conditions of supply and demand warrant."[61]

Hemlock. "The principal object" of the Northwestern Hemlock Manufacturers' Association "was to take measures to establish uniformity of grading."[62] For a time "an effort was made to keep members posted on the stock situation."[63] In 1898 began the issue of price lists. Efforts were made toward "bettering the hemlock situation by closer and better organization."

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[59] Opinion of first president of Pac. Coast Lum. Manuf. Assoc., 1906.

[60] Constitutions of 1891 and 1906; A. L., Jan. 27, 1906, p. 40.

[61] Constitution of 1906, Art. VIII: "It shall be understood that no member of this association is obligated to observe or be governed in any way in the sale of his lumber by the prices which may be recommended by the price list committee."

Minor Species. The associations of North Carolina pine manufacturers have aimed to establish uniform standards of grading and manufacturing and to "formulate a uniform basis of prices."[64] The West Virginia spruce producers issued official price lists as early, at least, as 1898.[65] To these the association activities appear to have been narrowly confined.[66] The activities of the Southern Cypress Manufacturers' Association, and of its predecessors, have been devoted to the promotion of "uniform business methods." Standard grading rules and terms of sale by 1906 had obtained general recognition. A well organized statistical department has been maintained that the members "can more intelligently meet competition."[67] The price activities have been usually conducted by a selling agency separate from the association.[68] The efforts at uniformity among hardwood manufacturers have been of comparatively little consequence. Effective joint action has been impracticable. A similar examination of the activities of other lumber manufacturers' associations warrants a number of generalizations regarding the policy of association activity.

THE TYPE OF MANUFACTURERS' ASSOCIATION.

Permanent organizations have been evolved out of informal occasional co-operation among producers. Originally these have covered relatively small areas and have been often limited to manufacturers of a single species. A marked tendency has developed since about 1900 toward the consolidation of the organized activities of the manufacturers. The direction of integration has been determined by two interests, often overlapping. The most important interest has been that in joint action among manufacturers of a single species.[69] The other has lead to consolidation for common interests among producers of different species located in a certain defined territory.[70] The first is a classification according to species; the second is geographical. Obviously, neither has been necessarily exclusive of the other. The associations of softwood manufacturers have been in general of the first type. The influence therefore which each has exercised over the production and the distribution of lumber has been concentrated mainly upon a single species.[71]

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[62] Northwestern Lumberman, May 8, 1897, p. 2.

[63] Same, Sept. 4, 1898, p. 8.

[64] A. L., Aug. 17, 1907, p. 45.

[65] N. Y. L. T. J., Dec. 15, 1898, p. 10.

[66] A. L., Nov. 6, 1909, p. 79.

[67] Loc. cit., Proceedings of 1st annual meeting of Southern Cypress Manufacturers' Association, 1906; address of president.

[68] M. V. L., Feb. 18, 1910, p. 40; N. O. L. T. J., Jan. 1, 1911, p. 45g.

[69] E. g., the Yellow Pine Manufacturers' Association; the Northern Pine Manufacturers' Association.

[70] E. g., the Northern Hemlock and Hardwood Manufacturers' Association; the Hardwood Manufacturers of the United States.

[71] The *individual interests* represented in any association have been, of course, often powerful in other producing regions and in other associations.

General purposes. The promotion of uniformity in grading practice, in terms of sale and in prices has been the purpose officially assigned by their founders, of nearly all of the associations of lumber manufacturers. Their methods and policies have covered a wide range. To increase the bargaining power of the manufacturer in the sale of his product statistics of the production, visible stock and consumption of lumber have been often distributed among the members. The market for competing species and for substitutes has frequently been described. The activity of other industries, general conditions of business, finance and politics, crop prospects—in fact, any factors which may influence the demand for lumber—have been currently reported by many associations. To the extent to which they have exercised the function of disseminating such information—a purpose for which they are well equipped—their policy has been one of education.

Price policy. Nearly all of the lumber manufacturers' associations in the United States have, since 1897, issued or secured the issuance of, uniform price lists in some form. By moral suasion especially, by appeal to trade ethics, and occasionally by threat, the observance of adopted lists has been insistently urged upon the membership. The estimate of the influence upon the lumber industry, especially upon the general level of lumber prices, attributable to the administration of this policy, has been reserved for a later chapter. It is evident that the price policy has grown to a conspicuous place among association activities.

Where the legality of "official" action has been in serious question; or where prosecution has been threatened—the public outcry against the "lumber trust" was vigorous in 1906 and 1907—"official" lists have been often discontinued. "Prevailing prices," "ascertained prices," "market reports," "market conditions," lists issued by separate publishers or by information bureaus, or high "basis" lists with current discount sheets have been substituted. In whatever form, however, the price interests of association members have found expression, there is no indication that the purposes or that the results achieved have varied substantially.[72]

Uniformity of lists. All of the important associations of manufacturers of white pine, southern yellow pine, fir, western pine, hemlock and North Carolina pine, and two associations of hardwood producers issued price lists between 1897 and 1906. The lists issued by the associations (or by lumber selling agencies) before 1900 were usually based upon actual current selling prices or upon those predicted for the immediate future. Between 1905 and 1907, during the period of most violent public protest against a so-called "lumber trust," official lists were discontinued. "Market reports" and "standard lists," serving, however, the same general purpose, have since then continued in some form. From close approximations to the actual current sales prices, the quotations in the "market reports" and in the "standard lists" have gradually developed into "basis" lists. These have been purposely higher than the anticipated actual prices. Current "discount sheets," however, have indicated the prevailing "concessions from list."

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[72] A. L., July 22, 1905, p. 38; N. Y. L. T. J., Jan. 1, 1906, p. 14; M. V. L., Mar. 8, 1904, p. 29.

Individual lumber manufacturers have frequently issued price lists. Many of these have shown an identity with current association lists in the prices quoted on so large a proportion of the items, that any distinction between them has been obviously a merely formal one. The anticipation of possible legal complications has induced the interdiction of the issue of their own lists, by many associations. Occasionally this function has been discharged by an independent publishing firm in whose name the lists have been issued. But in many cases the quotations themselves have continued to be supplied by the associations.[73]

THE NATIONAL LUMBER MANUFACTURERS' ASSOCIATION.

Perhaps the first inter-association activity occurred in the effort of representative lumbermen from various sections of the United States in convention (Cincinnati) in 1897, to plan means for the restoration of lumber to the dutiable list. In 1898 the Mississippi Valley Lumbermen's Association co-operated with the Southern Lumber Manufacturers' Association in promoting a uniform grading system. The extension of this system to all lumber producing regions was urged.[74] By 1901 the cordial relations between associations in different regions had resulted in informal co-operation in many matters of mutual interest. The National Lumber Manufacturers' Association was organized in 1902

> "as the outgrowth of an education that has been the direct result of our local organizations; * * * to develop that wider field now before us and the many problems that can only be solved by concerted action of all of the various local organizations in this country, put forth through this national body. Our local organizations have now expanded until almost the entire territory is covered; in some cases * * * the territory of one association overlapping that of another, with a consequent confusion of prices, grades

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[73] For example, the Broughton Standard Price List for northern pine was based on data supplied by the Mississippi Valley Lumbermen's Association (loc. cit., Letter, Canton Sawmill Co. to A. L. Broughton & Co., publishers, Minneapolis, Jan. 22, 1910). The C. A. Smith Company list of July 30, 1908, compared with lists current at the same time, issued by six other mills, shows an identity in the quotation of 95 per cent of the total number of items, 372. The Broughton Standard Price List, revised Jan. 9, 1909, compared with nine individual lists, showed identity in seven lists; variation in 10 of 336 items in another. In the ninth more than 97 per cent of the quotations were the same. Obviously (and naturally) the individual lists were, as a rule, copies of the "standard list." This itself was issued at the instance of the association.

A similar policy was adopted in the Southern States and in the Pacific Northwest (loc. cit., Letter, C. A. Smith Lumber Company, Minneapolis, to A. L. Broughton, Jan. 27, 1906). The directors of the Western Pine Manufacturers' Association, Spokane, decided on May 1, 1906,

> "that the association would not in the future issue price lists. The price-list committee would, however from time to time decide in its opinion the relative values of the different kinds of lumber and that if the members wanted lists printed they could get them from the Shaw and Borden Co., Spokane."

The North Carolina Pine Association, August 16, 1906, substituted the "market report" for the association price list.

[74] Loc. cit., Minutes of Mississippi Valley Lumbermen's Association, Annual Meeting, 1908.

> of lumber, and manufacture * * * . More uniformity along this line can, no doubt, be brought about by this national body."[75]

Official purposes. The official purposes of this inter-association activity were:

> "To promote uniformity in methods of manufacture and sale of lumber.
>
> "To unify * * * conflicting interests and eliminate * * * elements of friction * * * .
>
> "To gather and disseminate reliable statistics showing the annual production and consumption of the various kinds of lumber manufactured in this country, co-operating with and aiding other associations along this line.
>
> "To gather, compile and distribute information as to general trade conditions in lumber and kindred interests throughout the country.
>
> "To take up for discussion any and all questions of mutual interest that are National in their character and application * * * .
>
> "To strengthen the bonds of fellowship and inculcate more friendly relations among those engaged in the same calling and occupation, whose interests are common and lie along almost parallel lines * * * ."[76]

Special activities. The National Lumber Manufacturers' Credit Corporation, a credit rating bureau operated by the national association, publishes semi-annually the financial standing and the rated responsibility of lumber dealers. Its influence, however, concerns chiefly the retail distribution of lumber. The statistical work of the National Lumber Manufacturers' Association has been particularly active since 1910. Monthly bulletins are issued, showing the cut and shipments of selected representative mills in different regions and the relation of actual product to normal capacity.[77] Of considerable importance to the association has been its effort

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[75] Loc. cit., National Lumber Manufacturers' Association; Proceedings of 1st Annual Meeting, 1902. Also:

> "When lumber associations were first formed, the principal object was to obtain uniform prices. This was at that time a prime necessity, because of the lack of authentic information as to prevailing prices, demand, and competitive conditions. With the very complete organization of information bureaus every manufacturer is in position to make his own prices. For example, this association exchanges information with seventeen associations throughout the United States and Canada, and any weakness in market conditions and the cause therefor is easily ascertained." Loc. cit., Pacific Coast Lumber Manufacturers' Association, semi-annual report, No. 2, 1906.

[76] Loc. cit., National Lumber Manufacturers' Association, Constitution, 1902.

[77] It has been claimed that these statistics cover 30 per cent of the total output of all species. This information makes possible an estimate of the relative conditions in the lumber market. By comparison with similar previous conditions and by analogy, current demand and supply may be ascertained and prospective conditions forecasted. Official Report, Tenth Annual Convention, 1912, p. 34.

"by wide publicity, to mold public opinion to a more favorable attitude toward the lumber industry, and to serve as a medium through which the industry at large may express itself and exert its influence on all matters of common interest."[78].

Extent of affiliation. Every important species of lumber has been represented in the National Lumber Manufacturers' Association since its organization. The membership has increased from six affiliated associations in 1902 to eleven in 1914. An annual output of over 16 billion feet, or more than 35 per cent of the average total production of lumber in the United States, is represented in the constituent organizations.

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[78] Loc. cit., Letter, National Lumber Manufacturers' Association to Wisconsin Hardwood Lumbermen's Association, Jan. 7, 1910. In 1909 an active campaign was conducted for the retention of the duty on lumber.

CHAPTER IV.

OWNERSHIP AND PRICES OF STANDING TIMBER.

Public Land Legislation the Cause of Present Distribution.

The geographical distribution of merchantable timber in the United States has been described.[1] Lavish grants of public land and loose, poorly defined and ill-enforced general land laws have been the general historical causes of its present ownership.[2] Concerning the administration, for example, of the Timber and Stone Act, of 1879, a former Chief of the Field Service of the General Land Office, has said:[3]

> "In practice this law has resulted in the sale of over 12,000,000 acres of valuable timberlands, of which fully 10,000,000 acres were transferred to corporate or individual timberland investors by the entrymen. These lands brought the people or the General Government a gross sum of $30,000,000. At the date of sale they were reasonably worth $240,000,000. The profit of over $200,000,000 went not to the needy settler, * * * but to the wealthy investors. Not over a fractional part of 1 per cent of the timber purchased from the United States under this act is held, consumed, or even cut by the men and women who made the entries."

It has been estimated that in 1870 at least three-fourths of the timber now standing was owned by the United States.[4] About four-fifths is now under private ownership.

GENERAL LAWS.

An investigation by the Department of Commerce[5] has shown that at the beginning of 1911 the supply of stumpage in continental United States was about 2.8 trillion board feet. There has been a continuous tendency toward concentration in the private ownership of timber, the value of which, since its alienation from the public domain, has greatly increased. The administration of a public land policy designed to encourage agriculture[6] has given rise to a condition fraught with potential peril to the future of the lumber supply.

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[1] See supra, pp. 27, 28.

[2] Public Domain, pp. 233, 214-216; 332-356; 543; Report of Public Lands Commission, 1905, pp. 67, 72, 73; 49 Cong., 2 Sess., 1886, H. Ex. Doc., Vol. IX, No. 1, Pt. 5, pp. 93-95 (Report of Sec. of Interior).

[3] Report of the National Conservation Commission. 1909, Vol. III, pp. 387-389.

[4] The Lumber Industry, Pt. I, p. xvii.

[5] Ibid., p. 3. In 1907 the Department of Commerce was directed by Congress to institute an investigation of the lumber industry

> "with the particular object of ascertaining whether or not these high prices [i. e., of lumber] have resulted in whole or in part from any contract, agreement, or combination * * * or conspiracy in restraint of commerce * * *."

Reports have been issued on standing timber; concentration of timber ownership; land holdings of large timber owners; and competitive and market conditions in the production and wholesale distribution of lumber; The Lumber Industry, Pts. I-IV.

[6] Schenck, C. A., Forest Policy, p. 93.

Special Legislation.

Paternalistic legislation, and especially land subsidies to the western railroads have been the basis of the most conspicuous concentration in timber ownership. Of the total privately owned timber in the United States, 11 per cent is owned by three corporations (or 23.5 per cent of the total for the Pacific Northwest); 15.6 per cent by eight holders; 21.96 per cent by twenty-two; 31.6 per cent by ninety and 38.4 per cent—or approximately one-half (i. e., 48 per cent) of the total in the three great producing regions: the Lake States, the southern pine belt and the Pacific Northwest—by one hundred and ninety-five holders. Large holdings are more characteristic of the Pacific Northwest than of the Lake States or of the South, where railroad land grants have been relatively inconsiderable. Thus one-half of the privately owned timber in the Pacific Northwest is owned by thirty-eight individuals or corporations; in the southern pine region, by nine hundred and twenty-five, and in the Lake States by one hundred and forty-seven individual holders.[7]

Character and Policy of Ownership.

The financial strength of many owners has enabled them to withhold their timber from use, while the increase in its value has more than absorbed the accumulated charges against the holdings, i. e., taxes, insurance, interest on investment, etc. The superior financial resources of many of the owners of Pacific Northwest timber enabled them, for example, after the sharp decline in 1907 of lumber and log prices at West Coast mills, to substantially reduce their production despite the fact that a great surplus sawmill capacity had been erected under the stimulating influence of the "boom" prices of the preceding three years.[8]

During the same period, on the other hand, despite curtailment by many yellow pine mills, the *relative* total lumber production of the Southern States greatly increased.[9] Southern timber has been more weakly held.[10] Many manufacturers whose enterprises were heavily bonded were compelled, during 1907 and 1908, to sell enough lumber at the low prices then prevailing to enable them to discharge current obligations.[11] Others were relieved by the banks in order to prevent the gross overstocking of the yellow pine market. Concentrated ownership and superior financial strength have been closely correlated.[12]

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[7] See supra, p. 26, for statistics concerning the quantity of timber in each of these three regions.

[8] Dept. of Com., Spec. Rep. on Lum. and Shingle Ind., 1914, p. 42.

[9] See supra, Diagram 5, p. 28.

[10] A. L., June 25, 1902, p. 47; also Aug. 3, 1901, p. 41:

"Price depressing effects are often attributed to the lack of capital of the small mills and their necessity to realize early on the lumber they produce."

[11] Evidence recently collected and on file in the Bureau of Corporations indicates that in the general financial strength of ownership, fir, white pine and cypress timber is the most secure. Hemlock, except in Pennsylvania, is relatively weaker. Southern pine, a large proportion of which is of scattered ownership, is, despite the strength characteristic of many large holdings, conspicuously insecure. Southern cypress and California redwood are backed by organization the most powerful and complete in the lumber industry.

[12] St. L. L., Jan. 1, 1909, p. 44.

EFFECT UPON STUMPAGE PRICES.

If concentration in timber ownership has been accompanied, especially in the Pacific Northwest, by a greater degree of ability to withhold timber from use, the importance of its potential control over the raw material of lumber manufacture is apparent. The tendency toward the integration of holdings on a large scale has, however, been much less apparent in the South, the greatest single present source of lumber supply, and in the Lake region, than in the West. To show that such potential control has in fact been the cause of a rise in the price of timber by creating an artificial relative scarcity of supply, it must be demonstrated that a scarcity of timber for present use, i. e., manufacture, has actually existed. As long as an effective supply, sufficient to meet all current demands, has remained in the hands of the owners who have been willing to sell—or to manufacture—timber at current prices, can a scarcity distinct from that measure of scarcity due to the relative *total* exhaustion of timber supply, be said to have existed?

"Concentration does not imply higher prices." Of itself the fact that a large proportion of the remaining supply of timber stands in large holdings and that much of it has been withheld from current use, is not proof, *per se,* that stumpage prices have been increased. Nor does it show that such prices have been necessarily higher than they would have been, had the ownership been more scattered or had none of the timber been deliberately withheld from use. It does show that if the current demand at current prices can be entirely met only by resort to the timber which is now withheld, the control of such timber will enable the owner to force up the price of standing timber as long as the demand continues. It shows, moreover, that in such an event the power over supply of the individual holding would be in proportion to the quantity of timber held; hence the particular type of power incident to concentration, i. e., to large individual holding. Probably also the practicability of effective joint action in pursuance of a common policy of timber holding would be thereby increased. As long, however, as enough timber has been released at current prices to meet the entire current demand, it cannot be said that the withholding of a part of the total remaining supply of standing timber has necessarily caused an increase in the price.[18] As long as timber is not currently produced for current manufacture, the withholding of a part of the present supply is inevitable. The *purpose* of such withholding is not here a pertinent factor.

Current prices of timber, for utilization in current lumber manufacture, cannot rise above such a price as will still enable the lumber so produced to compete in the common markets with lumber that has been manufactured in regions where timber is not so withheld from immediate use. Current prices, in any region, of stumpage for current use are therefore limited by the prices of stumpage in every other, competing, region. As long, therefore, as West Coast manufacturers have continued to produce fir lumber and have continued to compete in mid-western markets with southern pine, the price of fir timber has not risen beyond a point imposed as a maximum by the competition of other species.

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[18] A check to any indefinite increase in the prices of stumpage has been recently interposed by the United States. The Forest Service for several years has offered for sale large blocks of mature timber. After advertisement at a minimum price fixed by law for at least 30 days, the timber is sold to the highest bidder. Since nearly 590 billion feet are so disposable by the Forest Service, the influence upon prices, under certain conditions, may be made very substantial. For. Prod., 1912, p. 62.

There remains, however, below this maximum price, a range of possible lower prices for fir standing timber. In the Pacific Northwest the recent demand for timber for speculative holding has tended to hold fir stumpage prices to the maximum. No amount of such speculative demand can, however, be said to have raised stumpage prices above such maximum. For if this had been true, it is obvious that the manufacture of fir lumber for sale in competitive markets, would have ceased since, by hypothesis, fir would have been unable to compete with southern and northern pine. Hence the demand for fir timber for current manufacture would have almost ceased. This is, however, contrary to the known facts of West Coast lumber manufacture.

Morover, any assumption that speculative holding of surplus timber supplies has increased the price at which fir has been actually utilized in current lumber manufacture, implies the existence of two prices for the same thing at the same time, i. e., one price for timber to be used at once; another for timber to be held for anticipated higher future prices. It is apparent that the principle of competitive timber price fixation has applied equally to species in all regions of the United States which have competed in the lumber market, with species from any other regions. Thus, speculative timber holding in a single region, as for example, in the Pacific Northwest, has not *per se* raised stumpage prices. Only when the competition of other regions shall have disappeared, to a degree to which there has not been as yet, even in a measure, an approximation, can the prices of standing timber be substantially increased through the influence of artificial restraint. Historically, the competition between sources of timber supply has been very keen. Obviously, therefore, the arbitrary withholding of timber from present use, considered as an active influence affecting stumpage prices, is largely a problem for the future.

Principle of competitive timber price fixation. What then has determined the prices of standing timber in all lumber manufacturing regions of the United States? Ultimately, the anticipated prices of the lumber to be sawed therefrom. This price in turn has been *objectively* limited by the competition of lumber from other sources. This principle has been true equally of regions where speculative timber holding has been extensively practiced as of regions where it has existed to a minimum degree only, if at all, provided that, and so long as, such regions have continued to manufacture lumber for sale in competitive markets.[14]

Subjective valuation cause of withholding of timber. The price at which timber is now held represents the present estimate by the owner of the anticipated future uses to be derived from such timber. Evidence of this is to be found in the practice of the deliberate withholding of timber from present use, because the present owner expects that the future returns from it will more than compensate him for his waiting. In other words, the value which he currently attaches to his timber is the estimated *present worth* to him of the sum of the future prices, which he, as the owner, expects to receive for it.

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[14] As has been shown in detail, competition between all the producing regions has been active. This has been true especially since 1894 when lower transcontinental rates greatly extended the competitive market for West Coast lumber.

Classes of Timber Owners.

Among timber owners there are three distinct classes.

First, those who, unwilling to use or to sell[15] at current prices, await anticipated future increases.

Second, those who are usually willing to use or to sell at current prices because, in their estimation, no sufficient net advantage is to be gained by waiting. This is the class of owners upon which taxes[16] and the accumulation of other carrying charges, has exercised the greatest influence. For any decrease or increase in the annual charges against their holdings may drive such owners out of the second class into the first or the third, respectively.

Third, those owners who are either willing, or are compelled, to use or sell timber at current prices, whether they be high or low, in order to realize upon it currently.

Attitude toward the present use of timber. As a rule the small owners and those whose lumber manufacturing enterprises have been heavily bonded have constituted the majority of the third class. As a class they are financially incapable of postponing the use or sale of timber. When current prices are high, the last two classes will use or sell timber; some of the first class perhaps, also, if the prices of lumber then prevailing be high enough. When prices are of medium height, none of the first class will use or sell and when prices are low many of the second class will join the first class until prices again rise.

Continuity of upward tendency of stumpage prices. Stumpage prices in the United States, however, have tended always to rise.[17] Any decline, therefore, has been considered as temporary. In periods of depression manufacturers, owning their own timber and financially able to withstand a temporary cessation of manufacture, have frequently either reduced their output or have shut down their mills completely, rather than to manufacture lumber for sale at prices which would not leave a margin for the stumpage used, equal to their estimate of its worth. The manufacturers, however, who fall in the third class of timber owner, have sometimes found it necessary, in order to meet their obligations, to in-

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[15] The expression "use or sell" is designed to cover all cases where timber is disposed of. For example, the same person acting as a timber owner may be considered to sell timber to himself in his second capacity as a manufacturer of lumber.

The principle stated may be generalized: No timber owner, unless he be forced to do so, will use his timber in such a way that he, in his capacity as owner, shall receive for it a price less than his estimate of the present worth to him (for whatever purpose) of such timber.

[16] See supra, p. 6.

[17] See supra, p. 5.

crease their production at an ever decreasing net profit per unit of product. Thus, after 1907, the influence of a substantial curtailment of yellow pine production by many of the larger mills was partially counteracted by a relative overproduction by the smaller and the weaker mills.[18] As a net result, the proportionate production of yellow pine increased from 31.1 per cent of the total production of lumber in 1906 to 32.8 per cent in 1907; to 33.8 per cent in 1908; and to 36.6 per cent in 1909. During the same period the production of fir lumber, which has been on the average in stronger financial holding, decreased from 13.2 per cent in 1906 to 11.8 per cent in 1907; to 11.1 per cent in 1908; and to 10.9 per cent in 1909.[19]

CURRENT STUMPAGE PRICES.

It may be assumed that, at any given period, the total potential supply of timber has been a constant quantity, i. e., incapable of substantial relative increase or decrease. The effective supply of timber, however—that which is actually on the market or available for current use—has varied according to the prevailing stumpage prices. Upon what then have the prevailing prices been dependent? Obviously, upon the current demand.

This demand may be for timber, either

First, for immediate use in the manufacture of lumber, or
Second, to be held in anticipation of higher future prices.

Demand with intent to current manufacture. But the demand for timber for current manufacture is limited. It cannot absorb the total potential supply. Furthermore, other things being equal, this type of demand would disappear in case the price at which the supply was offered were so high that the price paid for the stumpage added to the cost of manufacturing it into lumber, either equalled or exceeded the anticipated price of the product. Under such conditions, the manufacture of lumber would be suspended. The prices of lumber would then tend to rise in response to the diminished supply upon the market. Thus, the higher resultant price for lumber would enable the manufacturer to pay more for his timber. But, as has been shown, there have been many owners of timber either willing to use or to sell, or compelled to do so, at whatever price may at any time prevail.

The price at which standing timber has gone into current manufacture of lumber, has been limited by the anticipated price of the product. It could not therefore have been, on the average, so high as to have resulted in a net loss to the manufacturer. But the demand for timber for the purpose of long time investment would not have sought timber at a higher price as long as it could have been secured at the same price that the manufacturers were then paying for timber to be immediately converted into lumber. For it is obvious that at the same time and for the same thing in the same market there can be but one price. The actual price is not concerned with (nor does it distinguish between) the different purposes behind the current demand for timber, but only with the total effective demand, for whatever purpose.

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[18] See supra, Diagram 6, p. 29; also monthly reports of Yellow Pine Clearing House, Jan., 1907, to Dec., 1909.

[19] For. Ser. Bull. 77, 1906, p. 12; For. Prod., No. 10, 1907, p. 15; For. Prod., No. 2, 1909, pp. 11, 13.

Timber withholding a potential price influence. It is conceivable therefore that nearly all of the potential timber supply might have been secured for purposes of long time investment. In such event, the annual supply available for current manufacture would have been relatively small. Prices would therefore have tended to be proportionately high. Under such conditions it would have been true that the prices of timber had been raised by the institution of a condition of artificial relative scarcity. But the statistics of lumber production and the history of timber holding in the United States show clearly that such a condition in the ownership of merchantable timber has never existed.

Historical development of timber ownership. Extensive withholding of timber from use or sale in deliberate anticipation of higher future prices has been a comparatively recent development in the United States. In fact, in the Pacific Northwest, where present concentration of ownership has become most conspicuous, timberlands generally had no substantial value until after the early nineties. The continuity of the holding, by the railroads, of great tracts, for example, was due rather to inability to sell the timber given to them by the United States, than to a deliberate intention to hold such timber for future increases.[20] As a factor affecting supply, the concentration of holdings for investment cannot have been influential before the period, beginning about 1894, of the extension, directly encouraged by the railroads,[21] of the market for West Coast lumber.

Futhermore, in all lumber producing regions, during the entire period covered by the present study, a majority of the owners of timber have belonged to the second or the third class above enumerated. They have used or sold their timber for purposes of current manufacture. The price therefore, at which they have so disposed of their timber, has not been, on the average, higher than an amount equal to the expected price for the lumber (i. e., produced from it), less all costs of manufacture and sale, interest, and a profit at a rate high enough to command the continuation of the enterprise. Stumpage prices have lagged behind the prices of lumber during periods of rapid increase in the latter. The raw material has, however, always tended to absorb any increase in the margin between the costs of manufacture and sale and the selling price of the product. The temporary declines in lumber prices have been at the expense rather of the manufacturer's profits than of stumpage prices. As has been pointed out, such declines have been usually (and justly) considered to be of short duration.

Effect of historical conditions of ownership. The question yet remains: Why has not the demand for timber for investment as distinguished from the demand for current manufacture raised the price by reason of an artificial scarcity in the supply available for present use?

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[20] E. g., in 1900 the Northern Pacific Railway Company sold to the Weyerhaeuser Timber Company, 900,000 acres at the rate of about 6 cents per 1,000 feet of timber standing thereon (estimated). The Lumber Industry, Pt. II, pp. 6, 7.

[21] See supra, p. 10.

First, while the lumber industry was centered in the Lake States, timber was there held for current exploitation, and not as a rule, for long time investment.

Second, the shift to the South was the occasion of a considerable degree of investment in southern yellow pine timber with view to higher future prices.

The opening up of the forests of the Pacific Northwest was followed by a marked degree of concentration in the holding of timber and of investment with view to future price increments. On the other hand, in every producing region and throughout the period of the history of lumber manufacture in the United States, a majority of timber owners have manufactured lumber currently from their own timber. The price which they, as timber owners, have received, cannot therefore have been, on the average, higher than an amount which would still have enabled them, as manufacturers, to compete with lumber from other sources.

Concrete application of principle of competitive price fixation. Thus southern timber has prevented the price of white pine stumpage from rising above a certain competitive maximum. Similarly, West Coast timber has imposed a check upon the increase in price of southern timber. On the other hand, as long as the West Coast owners have continued to manufacture lumber, the price which they as manufacturers have paid for their timber has been limited, on the average, by the prices which they have received for their lumber. The prices of their lumber, however, have been limited by the prices of lumber from competing sources, especially by the prices of southern and northern pine. The price of stumpage, therefore, in no producing territory can, under known historical conditions of surplus timber supply, have risen above a limit imposed by the actual or potential competition of lumber from different sources.

Each region has thus exercised a check upon every other. Maximum current stumpage prices in those regions where concentration and with holding have been most conspicuous, have been, therefore, determined by the competition from other sources in which there has existed a less degree of such concentration.

Effect of exhaustion. If then concentration, per se, in the holding of timber has actually exercised any influence tending to increase the prices of stumpage, the effect thereof has been insignificant as distinguished from the general effect of relative exhaustion of the total timber supply.[22] The power over supply wielded by large holders of timber which is now withdrawn from use, can become substantially effective as a price raising influence, only when, in a greater degree than has in the past prevailed, the competition of other sources of supply which are not so controlled, shall have declined.

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[22] It is not to be inferred that the extensive concentration of timber holding, for example in the Pacific Northwest, has not had an incidental and inconsiderable actual effect upon the past prices of lumber because of a direct influence upon stumpage prices. For example, if the total stand of privately owned merchantable timber in the Pacific Northwest has been 1,000 billion feet and one-half of it has been withheld from present use; and if the average annual demand for current manufacture has been 10 billion feet, it is perhaps reasonable to assume that the price of 10 billion feet, at any time, when 500 billion feet are available for use or for sale, has not been much greater than it would have been had 1,000 billion feet been so available. The effect upon past prices of the withholding of 500 billion feet cannot have been substantial. Its potentiality will be realized only when that part of the total timber supply which is not so withheld, shall have become virtually exhausted.

As an explanation of past prices of lumber, the argument that large quantities of timber have been deliberately withheld from use, especially in the Pacific Northwest and to a very limited extent only in the North and South, is wholly inadequate. Any such interpretation of the following significant statement of the Department of Commerce, is therefore misleading:[23]

> "Whatever power over prices [of lumber] may arise from combinations in manufacture and distribution (as distinguished from timber owning), such power is insignificant and transitory compared to the control of the standing timber itself or a dominating part thereof."

Recent finding misleading. The purpose of the investigation from the report upon which this statement has been quoted, has been to make "full inquiry into the cause or causes of the high prices of lumber in its various stages of manufacture from the log; and the said investigation and inquiry shall be conducted with the particular object of ascertaining whether or not there exists among any corporations, companies or persons engaged in the manufacture or sale of lumber any combination, conspiracy, trust, agreement, or contract intended to operate in restraint of lawful trade or commerce in lumber or to increase the market price of lumber in any part of the United States."[24]

That the authorized investigation was concerned with past prices was the opinion of the Bureau of Corporations, by which the investigation has been conducted:

> "Both resolutions [of the Senate and the House of Representatives, respectively] call, in substance, for information on *the causes of the high prices* of lumber, and whether or not these high prices *have resulted* from any contract, agreement, or combination in restraint of commerce."[25]

Concentration a problem for the future. It is apparent that the finding of a large degree of concentration and of speculative holding of timber has been presented as having had a substantial bearing upon the course of past prices of lumber.[26] But to know the amount of the remaining supply of stumpage does not explain past prices. Nor has the now prevailing extent of concentration and of speculative holding, been shown to have been the historical cause of any substantial part of the past movements of lumber prices. The facts presented in the above finding are proof only of a situation which promises in the future to become a serious challenge to public policy. As such it should be identified in the scientific investigation of the organization of the lumber industry.

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[23] Commissioner of Corporations, Summary of Report; letter of submittal, Feb. 13, 1911, p. 5; in 61 Cong., 3 Sess., S. D., Vol. 85, No. 818.

[24] Senate Resolution; from The Lumber Industry, Pt. I, p. 2.

[25] Ibid., p. 3. Italics not in original text.

[26] "No answer to the request of the resolution as to the course of prices, or the existence of combination and its effect on the lumber business and the public, could safely be made without first determining approximately (1) the amount of the remaining supply of standing timber, and (2) the degree of concentration in the ownership thereof. These facts are basic." Ibid., p. 3.

Average Prices of Leading Species.

The following table shows the average course of stumpage prices in the United States for the period 1890 to 1907. That at all times a wide range has existed according to the quality, location and accessibility of the timber is obvious. Average prices therefore indicate only the general movement. The prices also for the later periods are for timber which, on the average, is of greater inaccessibility and of quality inferior to that of the earlier periods (e. g., 1890). The later prices are therefore not strictly comparable to the earlier. They should be increased in proportion to the degree of average decrease, since 1890, in the accessibility and the quality of the then remaining timber of each species.[27]

Furthermore, much of the West Coast timber which was included in the determination of average prices for 1907, belonged to the United States in 1890 and was therefore not so included. The prices of fir for 1890 in the following table,[28] are for the highest grades and the most accessible of the timber, i. e., that timber which was first alienated to private ownership from the public domain. The more inaccessible timber in 1890 had practically no value in the Pacific Northwest. For true comparability to later fir prices, the earlier must be very substantially reduced. To a less degree does this qualification extend also to southern pine stumpage.

TABLE 5.

	Stumpage: average value per M feet (dollars)			
	1890	1899	1904	1907
White pine	3.21	3.66	4.62	8.09
Yellow pine	.81	1.12	1.68	3.16
Douglas fir	.68	.77	1.05	1.44
Hemlock	1.15	2.56	3.51	4.51
Spruce	1.74	2.26	3.70	5.49
Oak	2.37	3.18	3.83	6.52
Cypress	.99	1.58	3.42	4.37
Poplar	2.14	2.81	3.89	4.64
Maple	1.69	2.66	3.82	2.50

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[27] E. g., the price in 1907 of white pine stumpage, equal in quality and accessibility to the average stand in 1890. would have been $10 to $12 in place of $8.09, which was the price of timber of an inferior average quality, etc. The corresponding difference in the southern pine prices is considerably less and in the case of West Coast timber much less.

[28] Figures for 1890, 1899 and 1904 are from census reports; those for 1907 from the reports to the Forest Service. For 1890 a weighted average has been constructed from the report of average prices for single species in each individual state in which that species is found. Report on Manufacturing Industries, Part III, Selected Industries, pp. 604-607. For example, the average price for oak has

The actual relative increase, as already noted, has been obscured by the depletion of the higher grades of many species. Furthermore, the "range" in the current prices of timber of the same species invalidates any attempt to arrive at a "representative" price of stumpage.[29] Whatever may have been the variations, however, the prevailing prices for all species have greatly increased. The actual increase may be shown more accurately in the course of prices for identical tracts of timber of a single species.[30]

Douglas Fir.

During the eighties the prevailing price of stumpage in Washington was not over 15 cents per M feet.[31] Between 1898 and 1908 prices trebled. A stand of 8 million feet (estimated) was bought in 1891 for $800 or for 10 cents per M feet. In 1909 the same tract was sold for $18,500 or for $2.31 per M feet. As late as 1903 a stand of 472 million feet (estimated) was purchased at 12.9 cents per M. In 1907, 59 cents per M was offered for the entire tract. A great deal of the timberland of the Pacific Northwest has been alienated from the public domain under the general land laws. Some of the timber in select areas has thus been sold by the United States at less than 4 cents per M feet. Similar conditions have largely prevailed in Oregon which now has a greater supply of merchantable timber than has any other state. Because of the extremely low original prices, a very large relative increase in stumpage prices in the Pacific Northwest does not necessarily imply a great absolute rise.

Southern Pine.

In 1909 a tract of timber in Louisiana, containing 302,224 M feet (estimated) was sold at $3.72 per M. More than four-fifths of this timber had been purchased from the United States in 1881 at a price of less than 8 cents per M feet. In southern Georgia longleaf yellow pine was bought in large quantities in 1872 at an average price of less than 6 cents per M. Timber of similar quality and location, of which but little remains, is now worth $4. A company manufacturing North Carolina pine, paid in 1895 for its timber rights an average price of 40 cents per M feet; in 1900, 67 cents; in 1907, $1.75, and in 1909, $2.28. Practically every instance of phenomenal increase in price has concerned timberlands bought from the United States or from the state governments. Without

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been computed as follows from the average prices for individual states: Tennessee (4); Arkansas (4); Ohio ((3); Indiana (3); West Virginia (3); Kentucky (4); Pennsylvania (2); Virginia (2); Mississippi (1). The numbers in parenthesis are the weights accorded, determined according to the proportionate production of oak by each state included.

[29] E. g., in a single county in North Carolina between 1906 and 1907 the price of pine timber ranged between 50 cents and $10 per M feet. In 1907 white pine prices (average) varied from $1.56 in Alabama to $11.51 in Wisconsin; to $10.78 in Michigan. Longleaf yellow pine prices ranged between $1.50 and $5.40; cypress between $1.50 and $12; fir between $1.11 in Oregon and $3 in New Mexico. For individual tracts in Washington fir prices varied from 50 cents to $5 per M feet.

[30] These data are from the records of the Bureau of Corporations, now merged in the Federal Trade Commission. They have been collected by special agents from the records of the manufacturers and the timber owners in the several regions.

[31] When stumpage was cheap the conventional sales unit was the acre of timberland. It is now the thousand feet. Amer. Forestry, Jan., 1915, p. 9b.

reference to the original low prices of timber, statements of the subsequent *relative* increase are easily deceptive.[32]

NORTHERN PINE.

In 1880 white pine timber in Minnesota was secured at an average price of from 50 cents to $1. At the same time it was worth $5 in many parts of Michigan, where merchantable timber was becoming scarce. Until after the Civil War white pine timberlands in Michigan were bought from the United States at from $1.25 to $2.50 per acre. After about 1880 stumpage prices in the Lake States advanced rapidly, until the improved facilities for the transportation of southern lumber brought yellow pine into sharp competition with it in northern markets. Since about 1890 therefore northern stumpage prices have been subject to the actual or the strong potential check of competition from other sources.[33]

Since 1880 the State of Minnesota has sold nearly 1.5 billion feet of timber from the State lands. Since the State is a large owner it has been able to bargain with strong buyers on equal terms. The following prices are therefore "top" prices, somewhat higher than the prevailing prices, but representative of a consistent and continuous sales policy on the part of the State. As of all other species, however, the comparability of these prices is subject to discount.[34]

1880	$1.47	1891	$2.14	1902	$8.38
1881	1.62	1892	1.89	1903	6.02
1882	1.57	1893	1.83	1904	7.71
1883	1.77	1894	1.80	1905	7.18
1884	2.11	1895	2.18	1906	9.00
1885	1.73	1896	2.06	1907	7.83
1886	2.19	1897	2.52	1908	....
1887	2.35	1898	2.86	1909	7.53
1888	2.54	1899	2.64	1910	8.00[35]
1889	2.18	1900	5.17	1911	
1890	2.25	1901	5.93	1912	
				1913	

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[32] E. g., in the Arkansas hardwood region a large holding was acquired in 1880 through the purchase "for taxes," at a price per M feet of timber of less than 2 cents. A part of this holding was sold in 1904 at a *relative* increase of more than 100 fold. The *absolute* price, however, was less than $2.50.

[33] By reference to Table 5 it is seen that by 1890 white pine stumpage had attained a comparatively high price level; but that since then the relative increase has not been as conspicuous as has that of many other species.

[34] That is, the commodity for which the price is given has not remained the same or similar. The later sales have been of the more remote timber. Moreover, whereas *white* pine only was considered in 1880, the recent prices represent an admixture of red pine, spruce, tamarack, etc., under the collective name of "northern pine." It is impracticable to determine a scale upon which later prices should be increased in order to secure strict comparability to those of 1880.

[35] A letter from the Auditor of the State of Minnesota, Nov. 2, 1914, stated that this has been, since 1909, the average price received for northern pine stumpage.

OTHER SPECIES.

The prices of all other important species have also greatly increased.[36] In 1880 "hemlock went begging";[36a] it is now a substantial competitor of all softwood species in the central markets. There is no indication that, in the behavior of stumpage prices, up to the present time, there has been a substantial, if indeed any, difference between the regions where concentration has been conspicuous and those where it has been inconsiderable. Nor can the actual increase in prices be accurately estimated for the reasons above described. Timber of such species, grades and sizes [37] is now cut for manufacture into lumber, as would not, in 1880, have been even included in the estimate of the stumpage on a given tract. Figures for recent years therefore tend to considerably understate the true relative rise. The phenomena of the changes in the prices of timber in the Pacific Northwest, even when all these factors have been considered and due allowance made for them, indicate the operation of no price-fixing influence different from that which has occasioned a coincident rise in the prices of timber in both the North and the South. If, in the past, the condition of concentration of holdings has been a distinct cause of high stumpage prices, the effect attributable to it has been inconsiderable.

STUMPAGE PRICES AND "COST OF PRODUCTION."

The "cost of production" of virgin timber in the United States has been merely the cost of making it accessible. The additional cost of "producing" logs has been merely a "harvesting" cost. This condition in the production of lumber has given rise to an agitation for higher timber prices on the supposition that no one will undertake to grow timber until the price of stumpage has reached the cost of growing it. This theory, originally espoused by conservationists, has been but recently advocated among timber owners themselves.[38]

Fallacious Conception of "Cost of Production." To what extent the policy of holders has been influenced by this view, available data are incompetent to show. Both large and small owners have, however, come to appreciate the fact that their timber is a part of a rapidly diminishing natural resource. The tendency to withdraw timber from present use has been doubtless strengthened by this propaganda. Whatever influence may have resulted, will have been exercised almost exclusively, however, upon the *future* conditions of timber supply.

The fallacies involved in this conception are:

First, higher prices encourage heavier, (as well as cleaner) cutting of timber and would only accelerate the approach of exhaustion. The very end for which higher prices have been advocated would thus tend to defeat itself.

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[36] E. g., cypress stumpage which was sold in 1890 for $1 was purchased in 1908 for $5 per M feet. In 1888 a less accessible stand of cypress in Louisiana cost about 15 cents per M. The price for the same timber in 1908 was $6. In 1890 hemlock timber in Wisconsin had almost no market price. In 1898 it was worth $1 and in 1907 from $4 to $5 per M feet. Similarly western pine, western white pine and larch timber prices were from 4 to 6 times as high in 1911 as they had been in 1900. Even then, however, only a small proportion of such timber in the Pacific and especially in the Rocky Mountain States was worth over $2.

[36a] 55 Cong., 1 Sess., 1897, S. D., Vol. 4, No. 40, p. 2.

[37] Considerations in Gathering Forestry Statistics (B. E. Fernow), Publications of Am. Stat. Assoc., Vol. VI, 1898, pp. 164, 165.

[38] Southern Lumberman, Dec. 24, 1910, p. 73.

Second, the willingness or purpose to grow timber at the present time is in no sense dependent upon present stumpage prices. It depends upon the price which the prospective grower thinks he can get for his timber *in the future,* when it is ready to cut or when the owner is ready to dispose of his interest. Therefore no solution of the problem is to be found in present prices and, indeed, only a partial solution in the anticipated prices of timber, 30, 50, 100 or more years hence.

There is in addition the important question of the possibility of securing the investment of capital in an enterprise the return from which is necessarily long postponed and contingent upon the realization of an anticipated price.[39] This price itself is subject to the possible intervention of changes in the demand for lumber and for other forest products. These changes cannot be predicted. Moreover under the present methods available for the financing of such an enterprise, the capital so invested would be peculiarly incapable of conversion into fluid capital. The future of forest ownership, to a large extent, depends upon the solution of these problems.[40] With this public question, however, the present historical study is not directly concerned.[41]

RELATION OF LOG PRICES TO LUMBER PRICES.

Log prices, representing the immediate raw material of lumber manufacture, follow much more closely than do the prices of standing timber, the current fluctuations in lumber prices. As has been noted, stumpage prices in the United States have tended always to rise. When lumber prices have declined many timber owners, especially of the second class, as described, have withheld their stumpage, either in whole or in part, from immediate use. Strictly defined, such timber cannot be said to then have a "price" since it is neither sold nor used. The reserved "price" in the mind of the owner, is therefore a valuation based on the anticipated prices which he expects to receive. Such "price" is not directly concerned with the present prevailing prices of lumber since the current prices do not allow a margin for his stumpage equal to the owner's estimate of its worth. It is seen therefore that the prices of timber, a raw material of rapidly diminishing relative supply, have not always followed the current movements of lumber prices during periods of decline. Stumpage prices, however, have tended to absorb current increases during periods of rising lumber prices.

Log Prices and Stumpage Prices Compared. Log prices have differed from stumpage prices in one essential particular. They are based ultimately and exclusively upon the current prices of lumber, whether these be high or low—or rather, perhaps, upon the prices of lumber anticipated for the immediate future. The fact that logs have been cut of itself indicates that they have been intended for immediate manufacture. Hence the prospect of higher distant future lumber prices has had no influence upon current log prices.[42] The close parallel of the course of average lumber prices to that of log prices indicates that the degree of adjustment between them has been very high. The single comparison is made in the following diagram[43] of the prices of fir logs in the Puget Sound region of the Pacific Northwest. In addition to the close general correspondence, the tendency is evident of price movements to appear first in the prices of *lumber.*

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[39] I. e., the bulk of the income is derived from the "financially mature crop." Under present methods of silviculture there are, of course, frequent intermediate thinnings which often yield a considerable return. See Maw, P. T. op. cit., pp. 233-235.

[40] See supra, p. 23, esp. note 81.

[41] Compton, Wilson, The Future of Forest Ownership; repr. from A. L., Dec. 19, 1914. pp. 23, 24.

No evidence is observed, in the comparison of these prices, of the operation of any substantial artificial influence upon lumber prices, unless such influence has affected equally the prices of logs and of lumber.

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[42] It may or may not have had an indirect effect in changing the quantity of logs to be cut. This has, however, depended upon the policy of the timber owner who has cut the logs.

[43] The statistics of log prices are from the following sources: A. L. and M. V. L., Tacoma News, Jan., 1904, to June, 1907; Apr., 1909, to 1910. The intervening prices are of actual sales taken from invoices as are also the prices of fir lumber for the entire period.

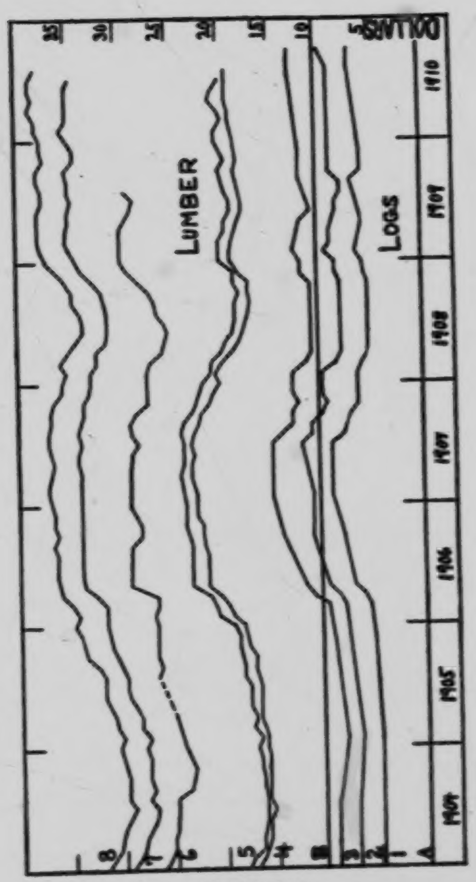

DIAGRAM 9.

Comparison of Prices of Fir Logs and Fir Lumber.

(A, base line for log prices; B, base line for lumber prices.)

Note: The index is referred to base line A. The prices of lumber, on base line B must therefore be diminished by 10 dollars, i. e., the difference between the base lines. Legend: Logs, "in the water," Puget Sound mills: 1, Flooring; 2, Merchantable; 3, No. 2. Lumber, f. o. b. Puget Sound mills: 4, Common dimension, 2"x4"x8-16'; 5, Common boards or shiplap, 1"x8"x12-16'; 6, Clear vertical grain flooring, 1"x4" or 1"x6"x10-16', No. 3; 7, same, No. 2; 8, same, No. 1.

CHAPTER V.

THE PRICES OF LUMBER.

Prices, 1860 to 1913.

The *range* of relative lumber prices as compared with general prices in the United States, since the appearance of the early evidences of exhaustion of Lake States timber in 1880 and 1881, has been shown in Diagram 1. It has been there indicated that the recent relative increase of lumber prices as compared with general prices began, not with the period of rising general prices in 1896, but with the period which marked the beginning of the shift of lumber manufacture from the Lake region to the more distant South, i. e., about 1880. As early at least as 1880, therefore, the general behaviour of lumber prices exhibited substantial peculiarities. The general causes of these peculiarities it has been the purpose of this study to describe.

It has been obviously impracticable to secure useful price data for the early period of local manufacture for local consumption. Grades of lumber were then often not distinguished. The growth of the industry, moreover, had been continuously but only gradually westward (see Diagram 5), and the cheap water transportation over the Great Lakes and the eastern waterways had not greatly increased the cost of lumber in the consuming markets. The succeeding shift, however, to a source almost a thousand miles distant, the product of which has had access to the markets at a much greater cost per unit, i. e., chiefly by rail transportation, has given rise to a condition in the industry, of relative exhaustion of timber, which it had previously experienced to only a small degree. That marked peculiarities in the course of lumber prices have appeared since about 1880, does not therefore imply that such peculiarities in some degree, or causes tending to produce such peculiarities, had no existence before that time.

The course of relative lumber prices in the United States for fifty-four years, 1860 to 1913, is shown in the following diagram:[1]

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[1] Every effort has been made to secure a series of prices as truly representative of the actual market in the United States as is possible in a single series. The index here given has been carefully verified by comparison with the various market reports in current trade literature. The sources and items upon which it has been based are given in detail in Appendix I. Throughout this study, except where specified to the contrary, "lumber prices" refers to this series. To be precisely accurate the weighting of the annual average prices of the different species should have been constantly altered to conform to the proportionate current cut of each species. Since continuous data on annual production by species have not been kept this method has been impracticable. The distribution of weights has been determined, therefore, with reference to estimates of production and consumption of lumber, in the files of the Forest Service, and based on census figures. See For. Ser. Circ. 166, 1909, p. 18.

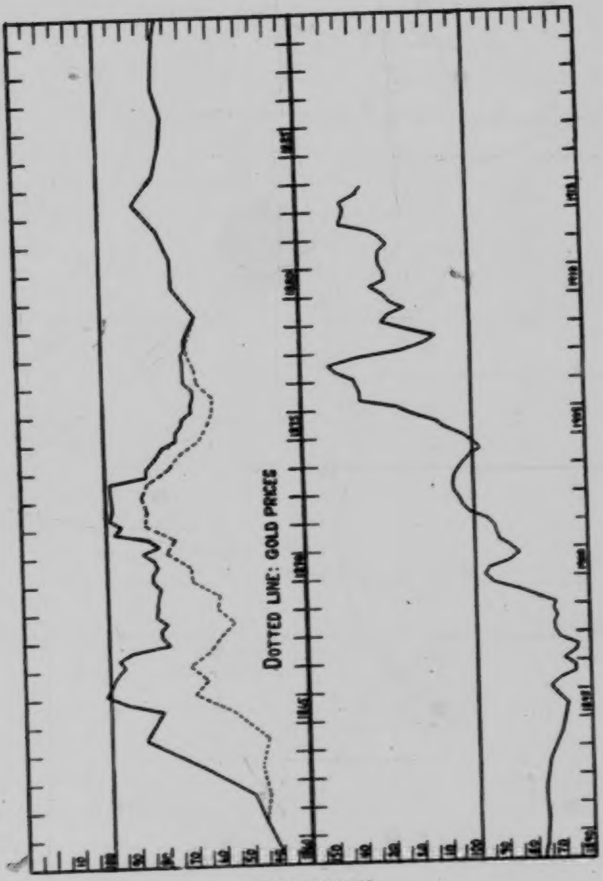

DIAGRAM 10.
Relative General Lumber Prices in the United States: Quarterly.
Note: Lower chart is a continuation of upper chart.

The base selected for this and for all other series of relative prices in this study (except where otherwise specified), has been the average monthly price for the period 1901 to 1903, inclusive, of all the included species of lumber. Its peculiar advantage has been that it divides into two almost equal parts the difference between the highest and the lowest prices for the period under review.[2] The graphical representation, therefore, of this series produces no substantial visual exaggeration of the relative rise or fall of prices for any part of the period.

General Movement of Prices.

The lowest price level during the period was in 1860, i. e., 40.5. Under the influence largely of a depreciated currency, prices increased during the next five years 150 per cent to 101.2 in the first quarter of 1866. Thereafter until about the period 1879 to 1881 lumber prices fluctuated more or less closely in accord with general prices. The former, however, responded more tardily and with greater irregularity to the variations in the gold prices of the "greenbacks" than did the average of "all commodities." The level of prices reached in 1866 (1st quarter), when gold was at a premium of nearly 40 per cent[3] was not again attained until 1902 (2nd quarter). At no period intervening, however, until 1896, did the general level of lumber prices fall below 65.

The net decline in lumber prices between 1879 and the period of lowest prices in 1897 was 2.48. During the same period[4] the decline in the level of general prices was 38.1 and of "lumber and building materials," 21.5. The courses of annual prices of the three classifications named, respectively, are compared in Diagram 11.

The proportionate rise in general prices, during the Civil War period appears exaggerated. For example, between 1862 and 1864, lumber prices increased 75.1 per cent and general prices 92.4 per cent. The graphical difference, however, appears much more pronounced. The curve of lumber prices, after crossing the base line (100) in 1902 has remained substantially above that of general prices as it had been continuously below it during the entire preceding period. Between 1860 and the period 1901 to 1903, general commodity prices showed a net decline of 26.2 or of 20.8 per cent of the average relative price in 1860.

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[2] This does not apply to the war period during which prices were exceedingly erratic.

[3] The daily premiums on gold during this quarter fluctuated between 44⅝ high and 25 low, opening at the former quotation on January 2, and closing at 28¼, on March 31. The cumulative effect of the higher prices of gold in 1865, however, is more largely reflected in lumber prices for 1866 than in general prices.

[4] General prices have been derived from the Bureau of Labor Statistics series for "all commodities," since 1890; for the period 1860 to 1890 from a similar series in the Senate (Aldrich) Finance Report of 1893. "Lumber and building materials" is a classification used in both of the above named series of prices. Although the articles incorporated therein have varied since 1860, the Bureau of Labor Statistics has presented the relative prices derived from them as reasonably comparable (Bull. 149, 1913, p. 179). This classification in 1913 consisted of 28 commodities. Of these 10 were of lumber, 2 of shingles, 1 of pine doors. The remaining items were of miscellaneous building materials in common use.

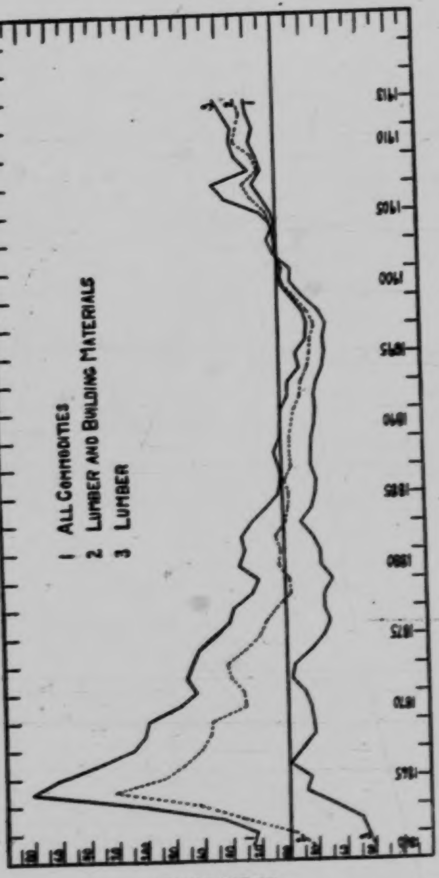

DIAGRAM 11.
Relative Prices 1860 to 1913: Annual.

During the same period, however, lumber prices increased 59.5 or 146.9 per cent of the average price in 1860.[5]

LUMBER PRICES AND GENERAL COMMODITY PRICES COMPARED.

Between 1873 and 1880 lumber prices as compared to general prices increased .5 per cent or less than .1 per cent annually. Their movements for this period were almost identical. Between 1880 and 1897, however, there was a net increase in lumber prices as compared to general prices,[6] of 48.7 per cent or of nearly 2.9 per cent annually (cumulative); between 1897 and 1913 of 38.4 per cent or at an annual rate of 2.4 per cent. It will be observed, however, that between 1897 and 1907 the rate of annual increase above that of general prices was 4.87; and that for the period 1907 to 1913 there has been an average net *decline* of 1.15 per cent annually. Considering, therefore, the relative price of all commodities for each successive year as 100, lumber prices as compared to general prices have risen as follows:[7]

1873 to 1880 at the average rate of .1 per cent annually;
1880 to 1897 at the average rate of 2.9 per cent annually;
1897 to 1913 at the average rate of 2.4 per cent annually;

But 1897 to 1907 at the average rate of 4.87 per cent annually; and 1907 to 1913, decreased at the average annual rate of 1.15 per cent.

RELATIVE RISE SINCE 1880.

Therefore, the average relative rise in lumber prices between 1897 and 1913, as compared with the course of general prices has not only been greater than the corresponding rise between 1880 and 1897, but has actually been slightly less.[8] The period beginning in 1880 has been sharply delineated by the constant divergence thereafter of the course of lumber prices from that of general prices. The degree of this divergence (cumulative) has increased continuously until 1907. Thereafter the direction of the net divergence has been reversed; the average increase in general prices since 1907 has been more rapid than that of lumber prices. The net current effect of price influences peculiar to lumber, first substantially evident in 1880, has therefore been intensified until 1907. Since 1907 the average net effect has been one of price depression.

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[5] General prices, 1860, 126.2; lumber prices, 40.5. If the latter had fallen in equal direct proportion to the fall in general prices, the relative price of lumber for the base period, 1901 to 1903, would have been 32.1 instead of 100. Procedure: 126.2 ÷ 40.5 × 100 — 100 = 211.6, i.e., the per cent comparative increase of lumber prices over general prices.

[6] Lumber prices, 1880, 74.6; 1897, 67.5.
General prices, 1880, 132; 1897, 80.3. Procedure: (80.3 ÷ 132) × 74.6 = 45.4; i. e., if lumber prices had fluctuated in the same direction and to the same degree as had general prices. But the lumber price for 1897 is 67.5. 67.5 ÷ 45.4 × 100 = 148.7. Therefore 148.7 — 100 = 48.7, i.e., the total net increase in lumber prices as compared to general prices for the period.

[7] These percentages are the measure of the effect of the price raising influences *peculiar* to lumber, i. e., as distinct from those tending to affect equally the prices of all commodities.

[8] From this essential point of view, i. e., of lumber prices in relation to general prices, the assumption that the remarkable rise in lumber prices has been only since 1896, 1897 (an assumption which has been in large measure responsible for the recent comment on, and investigation of, the lumber industry) is unfounded in fact. The fact that there has been an almost uninterrupted relative rise, since 1880, in the prices of lumber as compared with the relative prices of all commodities, has been confused because of the presence of an *absolute decline* in both.

PRICES OF BUILDING MATERIALS.

That the phenomena of lumber prices have not been characteristic of the prices of building materials generally is shown in Diagram 12. The normal movement of the prices of building materials has more nearly approximated that of general prices than that of lumber prices. In fact, were the items of lumber[9] eliminated from the classification of "building materials" the average prices of the latter would be on a level lower than that of general prices. Other things being equal, therefore, the relative rise since 1880 in the prices of lumber (as compared to all commodities) has not been due to influences operating upon building materials as such.

The upper division of the following diagram (1873 base year, 100) shows the remarkable degree to which, after about the year 1880, lumber prices have resisted *general* price depressing influences. The same phenomena have been shown in Diagram 1. The lower series indicates the rapidity of the recent rise from the point of minimum actual prices in 1897 (100) and the approximate uniformity of the relation of the prices of building materials intermediate between those of lumber and the prices of all commodities. During the ten years following 1897, lumber prices have increased 114.9 per cent as compared with a coincident increase in general prices of 44.6 per cent of the prices for the year 1897, respectively. Of the 114.9 per cent increase in lumber prices, 65.7 accrued between 1904 and 1907 and 41.8 during the single year 1906.

Price Classification by Species.

The conditions of the manufacture and distribution of the important species of lumber in the three great sources of production have been described above. It remains, therefore, to study the behaviour of the prices of individual species manufactured and sold under these conditions, and to compare them with the general prices of lumber of all species. The quarterly average relative prices of eight leading species, which contributed 79.2 per cent of the total cut of lumber in 1912, are shown in Diagram 13. The general index of lumber prices for this period has been derived from these prices of lumber of several individual species.[10] The course of prices in terms of percentages of the average price, 1901 to 1903, of each species is compared with that of other selected species as follows:

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[9] See supra, p. 78, note 4.

[10] These prices are representative also of most of the minor species not included. Fir prices, for example, fairly typify the course of the prices of western pine and of other western softwoods, which together constituted more than 6 per cent of the lumber manufactured in 1912. Oak prices, also, in a general way, well represent the market for the minor hardwoods, which comprised 9 per cent of the lumber cut in 1912. These minor species, however, have distinctively special uses and do not, therefore, proportionately affect the market for lumber for its major uses, i. e., for general construction and mill work.

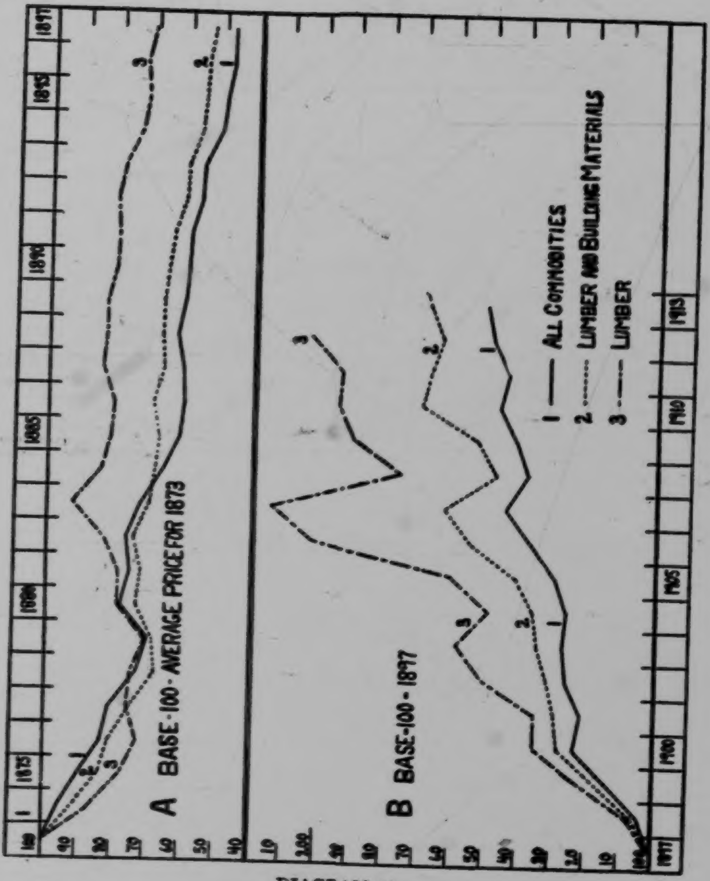

DIAGRAM 12.
Relative Prices 1873 to 1897 and 1897 to 1913: Annual.

TABLE 6.

Periodical Fluctuations in Lumber Prices.

	1897 to 1900 +	1900, 1901 −	1901 to 1903 +	1903, 1904 −	1904 to 1907 +	1907, 1908 −	1908 to [8] 1912 +	Price in 1897	Price in [8] 1912
Southern Yellow Pine	41.8	25.4[2]	27.9	18.7	74.8	70.8	50.8	61.6	142.
North Carolina Pine	41.5	23.4	27.3	7.8[4]	54.6[6]	42.9	35.8	67.7	152.8
Douglas Fir	44.7	21.9	39.2	23.4	70.7	43.3	23.7	54.3	133.1
White Pine (Northern)	28.6	6.9	23.5	3.5	49.5	17.1	15.3	61.1	150.5
Hemlock	45.5	29.6	40.4	5.2[5]	59.4	46.8	41.	58.2	162.8
Spruce	31.4	8.7[3]	13.9	2.5	29.2[6]	20.5	13.7	67.5	123.
Cypress	29.9[1]	2.1[3]	28.8	3.3[6]	19.1[7]	11.	2.7	55.1[1]	119.2
Oak	17.3	4.3	15.8	2.9	32.4	30.	33.	80.9	153.
Lumber	23.26	12.48[3]	23.29	10.11	52.84	38.11	33.09	64.52	145.3

[1] Begins in 1st quarter, 1899.
[2] To 4th quarter of 1900.
[3] To 3rd quarter of 1900.
[4] To 4th quarter of 1903.
[5] To 1st quarter of 1905.
[6] To 2nd quarter of 1906.
[7] To 4th quarter of 1906.
[8] 3rd quarter.
Note: These fluctuations are in terms of percentages of base prices, 1901 to 1909.
Symbols: + indicates an increase; — a decline.

TOTAL SUPPLY COMPARED TO ANNUAL CUT.

In the description of the conditions of the manufacture and distribution of lumber in the important historical and present sources of supply (See Chapters II and III) may be found the reasons for the variations in price behaviour shown in the above table. Of particular importance in this connection is the relation of the annual cut of timber to the total remaining supply of stumpage:

TABLE 7.

Relation of Average Annual Production to Total Supply.

	Total Timber Supply Per Cent	Lumber manufactured, 1909[12] Per Cent	Lumber manufactured, 1909[12] Per Cent of Total Timber Supply
United States	100.	100.	1.6
Pacific Northwest	53.5	17.7	.5
Southern States	17.5	29.7	2.7
Lake States	3.9	12.3	5.
All other States	25.1	40.3	2.5

For example, the rate of consumption of Lake States timber is now about ten times as rapid as that at which West Coast timber is being cut. An extension of the relation expressed in the third column above, to

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[11] It is interesting to note that the lowest price level after 1907 was reached during the same (3d) quarter of 1908 by all the species of softwood lumber. The minimum price for oak was reached in the 2d quarter. This implies the probability that the efficient cause of the decline was nation-wide in its effect and that it was removed at about the same time in all regions.

[12] The cut for 1909 was reported by the decennial census. It is therefore the most complete recent record available. The geographical distribution of the timber supply is that obtaining at the beginning of the year 1911. Only the Gulf States and Arkansas are included in the classification of "Southern States." The total supply referred to in this table includes both public and privately owned timber.

individual species shown in Diagram 13, indicates the following percentage ratio of annual cut (1910) to the total remaining stand of merchantable timber:[13]

Southern yellow pine, 3.89; Hemlock, 5.2; North Carolina pine, 8.01; Cypress, 2.3; Douglas fir, .9; White (northern) pine, 12.88.

INTERPRETATION OF PRICE MOVEMENTS.

The annual cut of fir is thus less than one per cent of the total stand in private holding. The rate of cutting of northern pine, on the other hand, is over fourteen times, and that of southern pine nearly five times as great as the rate of fir cutting.

A substantial explanation of the relatively rapid cutting of southern and northern pine is a psychological one. The greater the proportional increase in the price which the owner anticipates, the less likely is he to cut his timber. The lower the original price the greater will be the *proportionate* effect of a subsequent increase. When the price is as high as has been that of northern pine stumpage in recent years, any prospective increase, reasonably to be expected, would not be a considerable relative increase. As the relative or proportionate increase is the sort of increase in price in which the owner is interested, it has become more and more to his interest to cut rather than to hold. By this means he has evaded the accumulations of carrying charges. The price of West Coast timber, however, until recent years, has been nominal. Proportional increases have been very large and have tended to induce the withholding of timber for future price increments.

The following paragraphs may facilitate the interpretation of Diagram 13.[14]

Southern Yellow Pine. 1. 330.9. 2. Relatively scattered; many small holdings. 3. Confined chiefly to large mills. 4. Inadequate to dominate industry as a whole; members of the associations control less than one-third of the annual product. 5. Very efficient in the large mills; inefficient in the class of small mills. 6. Medium + to low +. 7. Low average; caused largely by extensive bonding of timber. Has resulted at

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[13] Includes only timber privately owned. The hemlock and white pine are for the Lake States. These figures are more accurately descriptive than are those of total supply of both public and private holdings, since the latter have not as yet entered prominently into lumber manufacture.

[14] The descriptions of individual species refer to private holdings and are based upon statistics dated up to and including the year 1910. Southern yellow pine is to be distinguished from North Carolina pine; the latter denotes the yellow pine product of Virginia and the Carolinas.

Following is the key to the numerical references in the text: 1. Supply of standing timber, in billion feet, board measure. 2. Ownership. 3. Organizations of manufacturers. 4. Joint action through the associations. 5. Logging and manufacturing equipment. 6. Average grade of product. 7. Average financial strength. 8. Competition for markets with other species of lumber. For a discussion of the comparative response to price influences, of different grades within a single species, see infra, pp. 93, 95.

"In times of depression low-grade lumber is sold at relatively cheaper, and in times of prosperity at relatively higher prices than the high-grade lumber." The Lumber Industry, Pt. IV, p. 331.

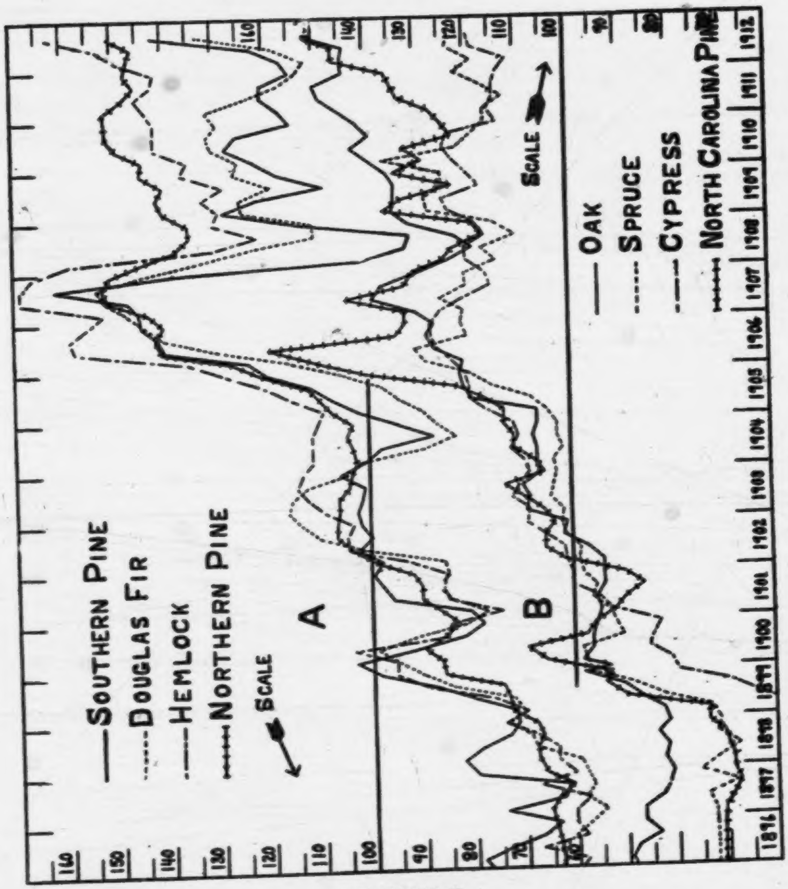

DIAGRAM 18.

Relative Average Prices of Lumber of Eight Species: Quarterly.

(N. B.—The difference in the scale for Charts A and B. The two series of prices, represented by A and B, are presented in this form so that the price movements of each species may be readily compared with those of every other species.)

times (e. g., in 1907, 1908) in the enforced liquidation of bonded assets, at a sacrifice, in order to meet accruing obligations. 8. Fir, northern pine, hemlock, North Carolina pine.

North Carolina Pine. 1. 53.5. 2. Less concentrated than in southern yellow pine. 3. Include large and small mills. 4. Inadequate 5. Average efficiency; use of kiln-drying method facilitates ready response to changes in current conditions of lumber supply. 6. Medium to low. 7. Average. 8. Chiefly with yellow pine in eastern markets; spruce.

Douglas Fir. 1. 521.9. 2. Concentrated (typically). 3. See supra, pp. 52ff. 4. Ibidem. 5. The most efficient in the industry. 6. High to medium. 7. The typical large holdings are financially secure. Many mills, however, have assumed bonded obligations similar to those of the southern pine manufacturers. In times of relatively low prices (e. g., 1907, 1908) the enforced increase in output, by a class of mills, in order to meet current obligations, has tended to still further depress the market by a relative overstocking.[15] 8. Southern pine, northern pine and hemlock in mid-western markets; other West Coast softwoods.

Northern Pine. 1. 17.7. 2. Recently the remaining timber has been concentrated into few hands; formerly holding was scattered. 3. Include mills cutting nearly one-half of the annual product. 4. Adequate to dominate the industry[16] in its principal manufacturing region (Minnesota) where the membership controls nearly 90 per cent of the average current cut. 5. Very efficient in the case of mills having reasonably large supply of timber in reserve. Where the stumpage has been nearly exhausted the maintenance of completely modernized equipment has not been justified by the prospect for continued operation. 6. Medium + to low —. 7. Very secure. 8. Hemlock, yellow pine and West Coast lumber in the medium and low grades. The small amount of high grade *white* pine experiences, practically, only the potential competition of other species, which become actually competitive only when the white pine prices have exceeded a maximum limit.

Hemlock. 1. 26.6. Hemlock (Lake States) has appropriated a large share of the market, since about the year 1900, relinquished by northern pine. It has almost the same geographical distribution as has northern pine and therefore equal accessibility to the markets. To its consequent strategic position, therefore, has been due, in large measure, the conspicuous increase in hemlock prices during the period covered by Diagram 13. An almost continuous car shortage, during 1906, 1907, greatly impeded the transportation of southern pine to northern markets. A substantial part of the demand was therefore diverted temporarily to hemlock. During the depression, following the panic, however, a decline in transportation activity ended the car shortage. Yellow pine lumber was thus enabled to reach the Wisconsin markets within three weeks. The prices of hemlock then sharply declined.

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[15] The chief effect of the panic and depression of 1907 and 1908 upon the prices of fir and of other western lumber, was indirect. The extremely low price of yellow pine enabled it to so far invade the fir market in the Middle West that the demand for the latter, especially in the medium grades, was greatly curtailed. The effects of the panic operated upon the West Coast lumber industry mainly through its influence in depressing the demand in the central and the mid-western markets.

[16] The influence of the present association, organized in 1908, distinct from the influence of the individual manufacturers, is difficult to determine. For many years the strategic position of the white pine producer has enabled him, because of the exhaustion of the timber, and entirely independent of any organized association activity, to secure maximum prices limited only by the competition of certain other species at lower prices. This limitation has continued to operate. Whatever specific effect may be attributable to joint activity has been reflected rather in a greater degree of uniformity of prices than in higher prices.

Moreover, the fact that at the current rate of cutting, there remained less than twenty years' supply (from 1910), tended to counteract the effect of the considerable degree of dissipation of the ownership of the standing timber and also the influence of the relative lack of financial strength among the hemlock manufacturers. The largest association represents less than one-sixth of the average annual cut.

Cypress. Because of the inaccessibility of the swampy southern cypress lands and the consequent high logging cost, cypress lumber was long unable to compete with species more favorably located. With the rise in general lumber prices, however, after 1897, the potential cypress market was greatly expanded.[17] Thus within three years after 1899 (1st quarter) the price of cypress lumber had increased from 55.1 to 100.1 and in 1903, to 111.7 (2d quarter) or more than double. The great increase in cypress prices thus occurred before the base years, 1901 to 1903. Having taken up most of the slack afforded, the competition of other species has limited the subsequent rise in cypress prices to comparatively narrow margins.[18] The exceptional financial security of the Louisiana red cypress manufacturers has been reflected in the relatively small decline in prices during periods of general decline in the prices of all species. Although the annual cut is only two and three-tenths per cent of the total supply of 40.4 billion feet in the United States, the rate of cutting in Louisiana, which contributes nearly two-thirds of the annual cypress product, is 3.9 per cent of the remaining supply of 15.7 billion feet.

EFFECT OF FINANCIAL STRENGTH OF HOLDING.

Those species of which almost the entire remaining supply has been securely held,[19] have shown a distinct capability of resisting price depressing influences. West Coast timber is typically in large strong holdings. Of this great supply a relatively small proportion—in the absolute, however, a large amount—has been held subject to current manufacture for the purpose of meeting the carrying charges and for immediate profits. This factor has tended to aggravate the price depressing influences by causing a relative over-supply during periods of slow demand. Thus, also, southern yellow pine and Lake States hemlock, which are, on the average, weakly held, have been incapable of resisting the forces leading to a general decline in lumber prices.[20]

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[17] Because of peculiar physical properties cypress has proven an especially suitable substitute for white pine. The rapidly increasing scarcity of the latter therefore has caused the diversion of much of its former market, in certain territory, to cypress lumber, especially of high quality. Because of the lack of physical qualifications, hemlock, although more favorably situated geographically, could not have met this demand.

[18] The cypress manufacturers initiated a vigorous advertising campaign, about the years 1897-1898, which has been in a measure, at least, responsible for the acquisition of new markets and for the sudden subsequent increase in demand.

[19] Northern pine, cypress and spruce. Undoubtedly oak also falls within this group, although precise data on its ownership are not available.

There has been, however, no observable historical connection between strong timber holding and high prices for lumber. In fact, the most conspicuous increases have been in the prices of species weakly held, e. g., southern yellow pine and hemlock. Cypress, spruce and oak, on the other hand, have shown smaller relative increases during the periods of general prosperity, especially during the period, 1904 to 1907. If then there have been an intimate connection between strong holding of timber and the organized activity of associations of lumber manufacturers, such connection cannot be said to have extended to the power of raising prices to a substantially higher level than has been reached by other species of lumber in the absence of such activity under a condition of untrammeled competition.

Nor can it be shown, from the figures above presented, that the prices of the species strongly held had, before the base period (1901 to 1903), appropriated the entire slack permitted by the competition of other species (as distinguished from the competition of lumber of the same species manufactured at other mills, i. e. as distinguished from competition *within the species*). For, the rise, between 1897 and 1900, in the prices of lumber of such species was no greater than—if, indeed, as great as—the rise in the prices of other species financially less secure.

RELATION OF SUPPLY TO PRICE.

A noticeable characteristic of the prices of lumber has been their sensitiveness to changes in the amount offered on the market, i. e., in the effective supply. Conversely the supply of all species, of some more rapidly than of others, has responded readily to the stimulus of higher prices. When prices have sharply fallen, however, the supply has less readily accommodated itself to the decline in the demand. This distinction has been due to three main factors:

First, the normal total sawmill *capacity* of the United States has greatly exceeded the volume of production needed to satisfy the average current demand for lumber.[21]

Second, the maintenance of a substantial "yard stock" has enabled the manufacturer to meet sudden demands. The use in many regions of the kiln-drying method—enabling the mill to ship dry lumber in a few days "from the stump," as compared to nine months often required by the air-drying process—has intensified the readiness of response to increases in current demand.

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[20] Southern yellow pine, during five quarters, 1907-1908, lost 70.8 of its gain of 74.8 during the preceding three years. Hemlock lost 46.8 of a similar gain of 59.4.

[21] Spec. Rep. on Lum. and Shing. Ind., 1914, p. 42.

Third, on the other hand, a large proportion of the mills in important lumber manufacturing regions have either voluntarily, or under financial pressure, continued to manufacture regardless of the current price conditions. Continued curtailment of production has been practicable only to those mills which have been capable of absorbing carrying charges.[22]

By disseminating among its clientele information on market conditions, the lumber trade journals have greatly increased the ability of the lumber manufacturers and dealers to intelligently appraise their own stock. This function has been, to a considerable extent, as has been observed,[23] absorbed and supplemented by the manufacturers' associations. Members have been often furnished with daily (or weekly) strategic reports on demand, supply and prices. The most comprehensive of such compilations have been those of the Yellow Pine Manufacturers' Association, and of its predecessors, since 1904. The following diagram of monthly cut and shipment compared with changes in the current supply and in the course of prices of yellow pine lumber is based upon these association statistics.[24] The reaction is shown of supply to changes in price and of price to changes in supply. In general the readjustment has been prompt.

ACTUAL AND QUOTED PRICES COMPARED.

In their response to changes in supply, prices as quoted in the reports of the associations, have shown a great lack of uniformity. From this fact unwarranted conclusions have often been drawn as to the nature of lumber prices. Generalizations founded, however, upon prices which, on the average, have been merely *asking prices,* have not reflected the actual market. This is obviously represented only by the weighted average of the prices at which actual sales have been made. Far therefore from proving an exception to the validity of the price equation, such apparent phenomena show only the inaccuracy of the so-called "prices" taken.[25]

Prices quoted in association or in manufacturers' lists have recorded,[26] as a rule, the extremes neither of rising nor of falling prices. Yet it has been such extremes especially which have shown the adjustment of prices to supply. On a scale exaggerated to indicate the degree of this adjustment, Diagram 15 represents the response of yellow pine actual prices to varying conditions of supply during a period, 1910 to

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[22] E. g., although the total production during the period of panic and depression after 1907 was greatly reduced, the proportionate reduction fell much short of the proportionate decline in total demand for lumber. For. Prod., 1911, p. 2. The demand for lumber in the great central markets during the early months of 1908 has been estimated at only 40 per cent of the demand during the corresponding months of 1907. A. L., Jan. 9, 1909, p. 34.

[23] See supra, pp. 55, 56.

[24] The annual production of the mills for which these compilations have been made was estimated in the "Report of Yellow Pine Clearing House" for September, 1914, at 10,495,375,000 feet. The data are, therefore, without question, representative of the southern pine belt.

[25] A. L., May 25, 1907, p. 5.

[26] See supra, p. 19, Diagram 3.

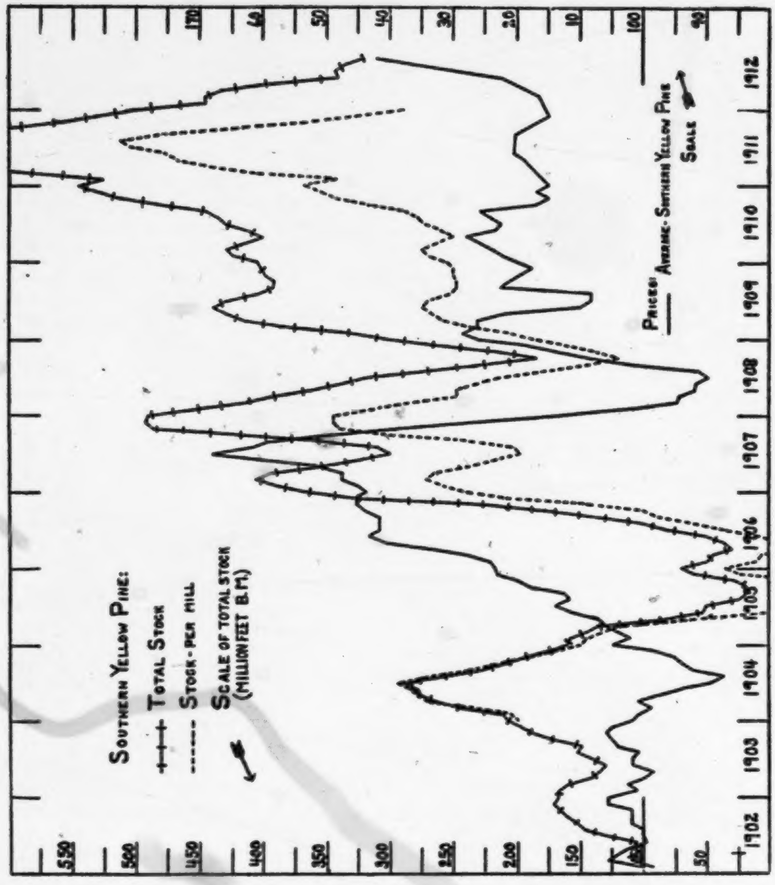

DIAGRAM 14.
Price Movements in Relation to Changes in the Supply of Lumber.

(N. B.—It is a mere coincidence that the price for January, 1902, is 100, i. e., the same as the average price for the base period, 1901 to 1903.)

1913, of comparatively stable prices.[27] The manufacturers' list prices show a much less precise adjustment to changes in the market conditions and frequently a wide divergence from the course of actual prices.

WHITE OR NORTHERN PINE.

Between 1880 and 1897 the average relative price of white pine lumber *increased* from 59.1 to 61.1.[28] During the same period, general lumber prices in the United States *declined* from 74.6 to 64.52. The degree of exhaustion of timber supply in northern pine forests has been the peculiar characteristic which has differentiated white pine supply from that of other softwood species. A net increase of more than three per cent during a period in which general prices[29] (of all commodities) declined 39.2 per cent, is in general a measure of the influence of the relative exhaustion of the supply of white pine timber.

For the period of ten years, 1897 to 1907, the relative rise of white pine prices was less radical but much more uniform than the rise in the prices of West Coast and of southern lumber. The smallness of the reserve timber supply had enabled white pine lumber, during the preceding period, to appropriate much of the slack permitted to it by the increasing competition of lumber from other sources. That is, the competition met by the white pine manufacturers, during this period (1897 to 1907) was chiefly from other species of lumber and from substitutes. Competition among white pine producers themselves had greatly declined because the normal demand for white pine lumber was capable of absorbing the entire output of all the mills. White pine was, therefore, before the base years, 1901 to 1903, on a higher relative price level than were the competing species, in the manufacture of which similar conditions of depleted supply of raw material were as yet much less acute. The subsequent increases in the prices of white pine lumber, as shown in Diagram 13, are therefore based upon a high base price. Although the actual increases, in dollars, have been as great or greater than those of the prices of other species, the relative increases have been less pronounced.

Northern pine prices have been more uniform than those of any other softwood (see supra, p. 83, Table 6). The knowledge that white pine has acquired a substantial "scarcity value" has enabled the manufacturers, without sacrificing their markets, to decline to sell at prices much lower than the maximum fixed by the competition of other species and above which the demand would have been substantially diverted to substitutes. They have long had the assurance that any proportion of the supply of lumber which they withdraw from the market will not be compensated by an increased output by other white pine mills. In other words, there has existed, generallv speaking, in a constantly increasing degree, a lack of that surplus mill capacity which has become so characteristic of the manufacture, for example, of West Coast lumber.

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[27] Since 1910 general lumber prices have not risen substantially but have fluctuated between wide margins. At present (January, 1916) there has been a general substantial increase in lumber prices throughout the United States after almost two years of continual depression in the industry.

[28] This was the lowest price for white pine in the year 1897. See Appendix I for items and sources upon which this computation is based.

[29] Bull. 149, Dept. of Labor Stat., p. 179.

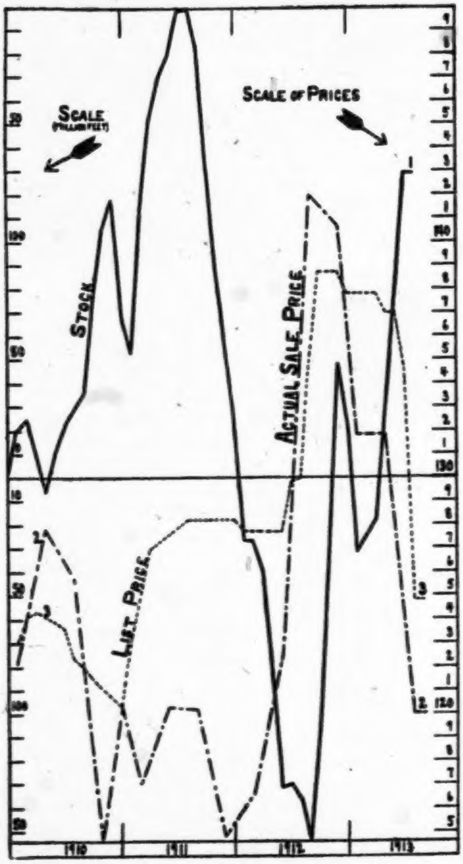

DIAGRAM 15.

Relation of Actual Sale Prices and List Prices to the Supply of Southern Yellow Pine Lumber.

(N. B.—Price scale refers to series of relative prices based on the average price for the period, 1901 to 1903.)

There has been no surplus mill capacity because there has been, comparatively speaking, no surplus white pine timber.[30]

RELATION OF GRADE TO PRICE.

The average relative prices of low grade lumber at the *mill* have normally risen higher and fallen lower than have those of the higher grades.[31] This fact is attributable in part to the principle upon which lumber freight tariffs have been fixed in the United States. These have been commodity tariffs making no discrimination between shipments of high grade or high priced lumber and of low grade or low priced lumber. The wholesale price at destination has been, therefore, the f. o. b. mill price plus the transportation costs, i. e., the *"delivered price."* The rail transportation costs, per unit, from any given source of supply, have been, since 1894, relatively constant.[32] Any increase in the price for lumber paid in the consuming markets, in excess of the mill price plus transportation costs, constitutes the margin which both the distributor and the manufacturer have sought to appropriate. That part which has been appropriated by the manufacturer has been at once added to the mill price of future shipments. But since the transportation cost per unit weight for all grades has been a constant, such an addition, which is a certain proportion of the price in the consuming market, is a still larger proportion of the price at the mill and a larger proportion of the mill price of low grade than of high grade lumber.[33]

RELATION OF TRANSPORTATION COSTS TO PRICES.

For the same reason, average mill prices of species, which have reached the market at the highest costs for transportation, have shown more radical relative advances and declines, *other things being equal*, than have the prices of species located near to the consuming centers.[34]

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[30] See supra, pp. 83, 84. On the other hand it must be remembered that when timber is already scarce and its price high the probable proportionate future increase in price will often not justify the withholding of timber from the saw, the holder meanwhile paying the carrying charges. The balances of these two considerations have apparently determined the recent policy of the northern pine manufacturers. The same situation will undoubtedly confront the owners of other species as such species, in the future, become exhausted to a constantly increasing degree.

[31] E. g., fir, common dimension lumber 2"x4"x8—16', f. o. b. Puget Sound increased in price from $3.75 in 1897 to $13.00 in 1907 and fell to $7.00 in 1908. Fir No. 1 clear v. g. flooring prices for the same dates, and basing point were $12.00, $27.00, and $23.50 respectively.

[32] See supra, pp. 16, 17.

[33] A Puget Sound mill ships 1,000 feet each of low grade and high grade fir,—mill prices 10. dollars and 20. dollars respectively. If the rate applying be 50 cents per 100 pounds and the weight of each shipment be 2,000 pounds, the delivered prices are 20. dollars and 30. dollars respectively. If the prices in the market increase 10 per cent the prices will be 22 dollars and 33 dollars respectively. Assuming that the manufacturer is able to appropriate one-half of these increases or 1. dollar and 1.50 dollars respectively, the mill prices will thereupon become 11. and 21.50 dollars. The *relative* increase in the price of the low grade item will have been 10 per cent; in that of the high grade item, 7.5 per cent.

[34] E. g., fir and yellow pine as compared with spruce and oak, the latter being very close to their consuming markets. See Diagram 13. It will be correctly observed that the course of *mill* prices tends to exaggerate somewhat the fluctuations of wholesale prices in the markets most distant from the sources of supply. Mill

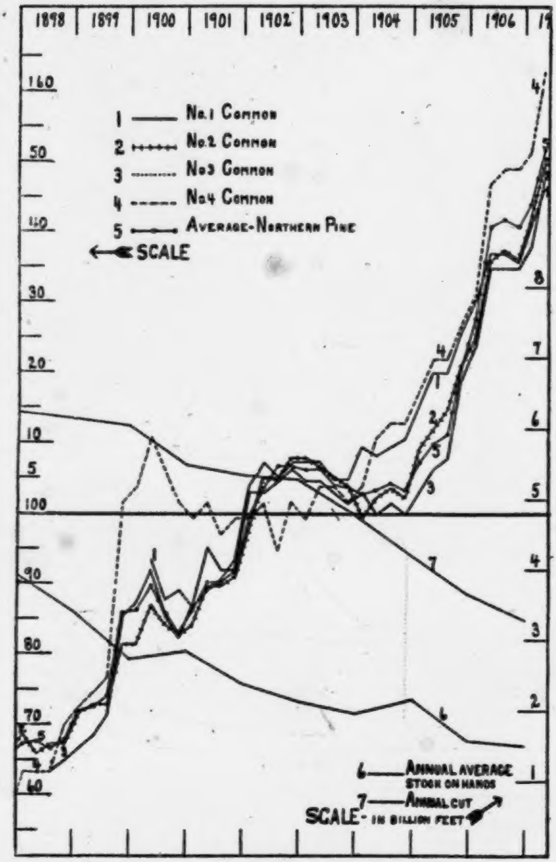

DIAGRAM 16.
Relative Price Movements of Different Grades of Northern Pine.

The species originating at the greatest distances from consuming territory offer a parallelism to the low grade or low priced lumber; the near-by species to the high grade or high priced lumber. This phenomenon has been a direct consequence of the relative exhaustion of supply near at hand. In the accompanying diagram are compared the price movements, respectively, of Nos. 1, 2, 3 and 4, common northern pine boards, f. o. b. Minneapolis, for the period 1897 to 1907.

Price Differential Between Markets.

The more or less wide general range of prices for the same item of the same species in the same (large) market has been described (see Diagram 3). There has been also a substantial approximation to a constant differential between the prices for the same item in different markets. The degree of uniformity has varied with different species and with different markets. Mill prices which represent the net average of the local conditions in all the tributary markets, are therefore more typical of the species than are prices for a single market, unless indeed such market be itself a basing point for the distribution of lumber.

The uniformity of the differential between markets has not been noticeably greater in the case of a high priced, relatively non-competitive item (quartered oak), than in the case of one that is low priced and competitive (northern pine dimension). The prices of quartered oak during the period 1897 to 1910 have exhibited a comparatively constant differential between the large eastern markets;[88] a less uniform one between these markets and St. Louis and Chicago, the latter having been, in a large measure, basing points for the distribution of hardwood lumber. Diagram 17 shows the intermarket relations between the prices of quartered white oak, firsts and seconds, 1 inch rough boards and of northern pine 2 by 4 inch dimension. The base line of the former represents the current prices in the St. Louis hardwood market; of the latter the prices in Western Wisconsin.[89]

THE NORMAL DIFFERENTIAL.

If allowance be made for the periodical abnormal conditions in the St. Louis oak market, it is seen that the differential has been reasonably

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prices are, however, because of their comparability and because they represent average conditions in a wide range of markets and not those in a single market, to the best interest of the present study. They best represent, moreover, the actual effect of the diminution of timber supply convenient to the markets, which has been a factor of controlling importance, historically, in the fixation of the prices of lumber. In any case the margin of possible error is not a substantial one, as will be seen, for example, by a comparison of the price curves of four grades of northern pine in Diagram 16.

[88] Boston, New York, Philadelphia and Buffalo.

[89] Since the price (St. Louis) of quartered oak has been about four times the price of northern pine dimension (Western Wisconsin) the scale of differences used in the upper chart is four times that of the lower. The relative fluctuations are therefore comparable as shown in the respective curves. The lower marginal inserts to each chart are, respectively, the January prices in dollars for northern pine in Western Wisconsin (upper) and the current semi-annual prices of quartered oak in St. Louis (lower).

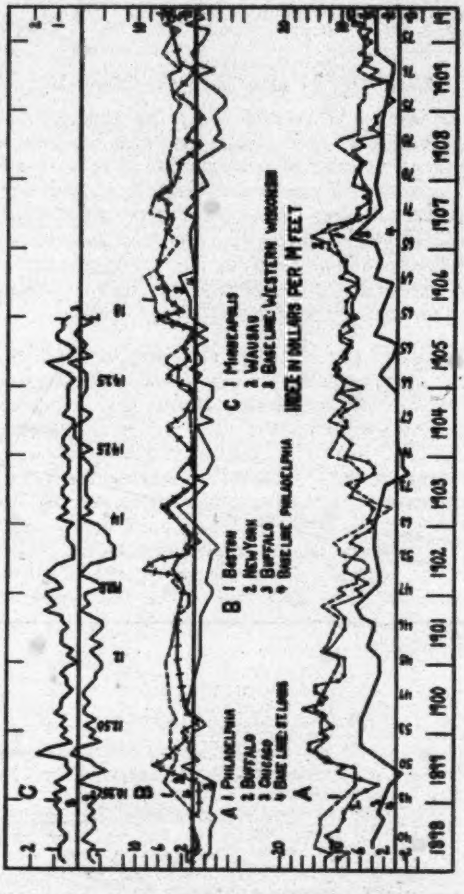

DIAGRAM 17.
The Price Differential Between Markets.
(Items A and B, quartered white oak rough boards, firsts and seconds, 1"; C, northern pine dimension, 2"x4"x12-16'.)

uniform.[37] In theory the differential between markets, *other things being equal,* is normally the difference in the respective transportation costs from the sources of lumber supply. This difference, in fact, however, has been always modified (i. e., either increased or diminished) by a factor which is itself the measure of the normal competition of each species with all other species and with substitutes for lumber, in the same market. For example, the price for which, for many years, Douglas fir lumber was sold to distributors in Minneapolis, was about two dollars less than the sum of the price of the same item as sold in Portland by Portland mills, plus the cost of transportation to Minneapolis. That is, the Portland price for Minneapolis shipments was two dollars less than the Portland price for domestic consumption. In Portland, West Coast lumber had experienced almost no competition. In Minneapolis it met with keen competition from northern pine and hemlock and the potential competition of southern pine.

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[37] As shown in the lower chart, oak prices in St. Louis as compared to the other markets, were abnormally high during the latter months of 1898 and the first months of 1899; also in 1902 and 1903 and generally during the period, 1907 to 1909. For eight months ending in May, 1899, the mills supplying the St. Louis market had been handicapped severely by continued bad weather. This condition resulted in a scarcity of logs and compelled the shutting down of many mills. The condition of temporary scarcity of oak lumber was reflected in the St. Louis market. Consequently St. Louis prices had practically reached, in May, 1899, the high point which was not attained in the other markets until early in 1900. (N. O. L. T. J., 1899, Feb. 1, p. 23; 15, p. 19; Mar. 1, p. 23; 15, p. 24; Apr. 1, p. 20; May 15, p. 21; June 1, p. 21; Sept. 1, p. 20.) Although during the third quarter of 1901 St. Louis quartered oak prices temporarily declined (A. L., 1901, July 29, p. 40; Aug. 10, p. 39; 24, p. 38) because of a diversion of demand to plain sawed oak, the closing prices showed a net increase which was not characteristic of other markets. See supra, Diagram 13, p. .. V9. (A. L., Sept. 21, p. 37; Oct. 5, p. 37; 26, p. 40; Dec. 14, p. 44; 28, p. 40.) During most of the years 1902 and 1903 there was a continued scarcity of quartered oak in St. Louis and in its tributary sources of supply. As a result of these local conditions the St. Louis prices, in August, 1903, reached a point 5 per cent higher than the highest prices during 1907. This abnormal condition of course greatly decreased the differential between the prices in St. Louis and in other markets. (A. L., 1902, Feb. 8, p. 47; Mar. 8, p. 59; 29, p. 48; May 10, p. 48; June 14, p. 54; Nov. 1, p. 77; 29, p. 53; Dec. 27, p. 48; same, 1903, Jan. 3, p. 56: increase in price of 36.4 per cent in one year; Feb. 2, p. 52; 28, p. 56; Mar. 7, p. 52; esp. Apr. 15, p. 64; Oct. 31, p. 59; Dec. 26, p. 66; N. O. L. T. J., 1904, Jan. 1, p. 32.) Because of the great rise in prices during this period an increased supply was eventually called out while the demand was being diverted in part, to quartered red oak or to plain white or red oak. Consequently the rise in prices during the period, 1904 to 1907, so pronounced in the general lumber market throughout the United States, was much less conspicuous in the St. Louis market. Nor was the decline in prices after the panic of 1907 as pronounced as in the eastern markets where the depression was more acute. (See supra, Chapter I, p. 14.) Within two years after the panic St. Louis prices were more than 6 per cent higher than they had been in 1907 while in the eastern markets the recovery had been much less rapid. (M. V. L., 1907, Sept. 3, p. 78: "easy to secure asking prices;" Nov. 1, p. 34; 15, p. 40; A. L., Jan. 25, p. 93; M. V. L., May 15, p. 41; Sept. 18, p. 40; St. L. L., Dec. 1, p. 80; 1909, St. L. L., Feb. 15, p. 111; Apr. 1, p. 95; May 15: quartered white oak very scarce and high in price; N. O. L. T. J., Dec. 1, p. 33.) Allowing for differences due to local conditions of manufacture and distribution, the diagram indicates a close approximation to a constant differential.

In the tracing of the course of oak prices in a single market a principle is illustrated which has been characteristic of all the markets for lumber in the United States, in a greater or less degree. This is the slowness with which normal competitive conditions, once considerably disturbed, have reasserted them-

Influence of Competition From Other Species.

If the West Coast mills therefore wished to ship fir lumber to Minneapolis they were compelled, by competition, to do so at an f. o. b. mill price, two dollars lower than the price which they received in Portland for similar items of lumber for local use. Consequently they practised a two-price policy,[38] a higher price on domestic sales and a lower on sales to territory where the competition was more acute. The factor which measured the difference in the normal competition of other species with fir in the two markets was (about) two dollars. The same principle has been equally operative as respects other species and other markets. It is not true that the normal difference in price for the same item as between different markets has been the *difference in the costs of transportation*. This would have been true only in case the condition, other things being equal, had been realized. But other things have not been equal. There have been great differences in different markets in the intensity of the competition between one species and other species and between lumber and substitutes for lumber. The normal difference therefore has been the net difference in transportation costs as modified by the normal competitive factor. This factor itself has varied from market to market and from period to period, as the geographical relation of the lumber producing regions to the consuming markets has gradually shifted.[39]

Relation of Building Activity to General Lumber Prices.

More than forty per cent of the annual lumber output now goes direct from the sawmill into general building and construction. Thirty per cent is consumed in the form of planing mill products, i. e., flooring and finishing lumber, sashes, doors and blinds, etc. Ten per cent enters into the manufacture of boxes and crates and three per cent into car construction.[40] Four classes of uses therefore have absorbed more than four-fifths of the total product of lumber, including nearly all of the product of softwood.[41] Rough and dressed lumber used in general building and construction, and planing mill products have constituted more than eighty per cent of the lumber of these four classifications. Planing mill products moreover have been closely associated with the use of general building materials of all kinds. The condition of the lumber market therefore has been directly affected by changes in building activity.

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selves. In this principle lies the secret of the success of a number of concerted efforts by association, in *temporarily* raising prices in certain limited territory.

[38] Fir export prices have been, since 1897, normally higher than the prices at the same mills for domestic rail shipments. For example, the export prices of rough common fir lumber in 1902 were 48.4 per cent and in 1907, 21.4 per cent higher, as reported by the associations of West Coast manufacturers, than were the mill prices of eastern rail shipments. The average difference, however, has been much less. Proceedings of Pac. Coast Lum. Man. Assn. Meeting, 1910; in A. L., Feb. 5, p. 67.

[39] See supra, pp. 21, 22; also Diagram 8, p. 35.

[40] The 1909 percentages for the four classes of uses here enumerated were 42, 33, 10 and 2.8, respectively; total, 87.8.

[41] The remaining classifications comprise the factory uses of lumber, chiefly hardwood, or 17 per cent of the annual cut. During the year 1909, on which these figures are based, hardwoods constituted 23.1 per cent of the lumber output; during 1912, 22 per cent. For. Prod., No. 2, 1909, p. 11; 1912, p. 10.

Even where other building materials have been used, great quantities of lumber have been required for finishing, and during construction for scaffolding, and for other purposes. The relation of building activity and lumber prices to current industrial and financial conditions has been interpreted by Brookmire:[42]

> "When the bankers have plenty of money they advise the directors of Railroads and Industrial Corporations to go ahead with improvements and construction work. Immediately there is a big increase in steel orders and building permits, as in 1902, 1905, 1909 and 1912. Then follows a general upward movement in steel, cement and lumber prices. [See Diagram 13.] When money gets tight, however, the bankers are compelled to curtail loans, and liquidation has got to come, as in 1903, 1907 and 1913."

Lumber, like steel, has been a sensitive barometer of conditions of prosperity or of depression. To these it has responded with rapidity.

CREDIT CONDITIONS IN RELATION TO BUILDING ENTERPRISE.

The prostration of credit, imposing a check upon all forms of business activity, has been an especially effective check to those extensive building operations which have required bond issues. Purchases of lumber by the railroads and by many wood-using factories have, under such conditions, been reduced to a minimum. Improvements and extensions, however, to such manufacturing plants as have been least handicapped by the collapse of credit, and buildings erected by private enterprise can be financed without resort to the credit markets. These tend to maintain a large volume of building, being greatly stimulated by the low prices of building materials during the depression.

Furthermore, the industrial and financial conditions caused by a depression are favorable to an increase in building activity. Abundant labor, cheap lumber and other materials, low interest rates—these factors tend to make the building depression and the low prices for lumber self-corrective. For example, the low lumber prices of 1908, cheaper labor and easy money led to a great building "boom" in the latter part of 1908 and throughout 1909.[43] That general lumber prices have, despite the great building activity since 1909, so slowly recovered from the decline experienced during 1907-1908 is presumptive evidence either

First, that the "boom" lumber prices of 1904 to 1907 were fictitious[44] or

Second, that, since 1907, the increased use of substitutes for lumber has deprived the lumber market of a substantial portion of its accustomed share of the demand for building materials, incident to building prosperity.

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[42] The Brookmire Economic Service, p. 1001.

[43] Building operations in 1909 were the most extensive on record. See The Brookmire Economic Service, p. 1001.

[44] This alternative bears directly upon the question as to whether artificial influences due to concerted action by associations of lumber manufacturers were responsible for the high prices during this period.

Although the extent of building for each year since 1908 has been greater than that for any preceding year, the prices of lumber have made a net regain (1914) of less than two-thirds of the loss during the depression of 1907-1908.[45]

Effect of Building Activity on Prices of Dimension Lumber.

Not only has two by four dimension stock been used strictly for building purposes but it has also been the most universally used item of lumber in construction. Although the courses of the prices of dimension have differed slightly—but unessentially—from the average prices for lumber of each respective species, they are properly comparable in the following diagram with the fluctuations in building activity.

Reaction of Lumber Prices to Building Prosperity before 1907.

To determine the causes of the slow regain by lumber prices since 1908, of their former level, it has been necessary to examine the behavior of such prices after similar preceding depressions. After the panic of 1873, for example, building greatly declined in New York City. A drop in 1874 of 33 per cent[46] was followed by an advance of less than 10 per cent in 1875; a decline of 14 per cent in 1876; a still further decline of 10 per cent in 1877 and an increase of 6 per cent in 1878. Not until 1881 did the amount of building in New York City equal that of eight years before. Meanwhile lumber prices had dropped about 25 per cent, reaching a minimum during the period of minimum building activity.

In 1888 there was again a conspicuous decline in building. This was more than recovered during 1889 and 1890. Lumber prices in New York[47] as compared with general commodity prices, declined 5 per cent in 1888. This decline was regained in 1889. During the year of the panic of 1893 there occurred a 15 per cent decline in building and a 6 per cent decline in lumber prices. The year 1895, however, marked the high point in building up to that time. Lumber prices, as compared to general prices, also increased. (See supra, Diagram 1.) Similarly, the great increase in building in New York City during 1899 was accompanied by a 10 per cent increase in lumber prices. In 1900 there was a sharp decline in building and a rapid recovery in 1901. There was also a substantial coincident drop in the prices of lumber and an equally rapid recovery. From 1908 to 1909 building in New York City increased from 95.5 million dollars to 144.3 million, and in 1910 to 108.6 million. New York lumber prices, however, increased only 2 per cent in 1909 as compared with the average for the year 1908, and less than 3 per cent in 1910. During this period, as compared with general prices, there was a net decline as contrasted with an almost uniform positive increase during the similar periods preceding.

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[45] See supra, Diagrams 10, 13, 18.

[46] Percentages are in terms of the figures for the immediately preceding year. These data have been taken from the files of the "Building Age," esp., Vol. XXXIII, 1911, p. 474 ff; also "Carpentry and Building," Vol. I, 1879.

[47] "New York is by far the largest consumer of building materials and building labor in the United States." Clay-Working Industries, Bull. of U. S. Geological Survey, 1909, p. 502.

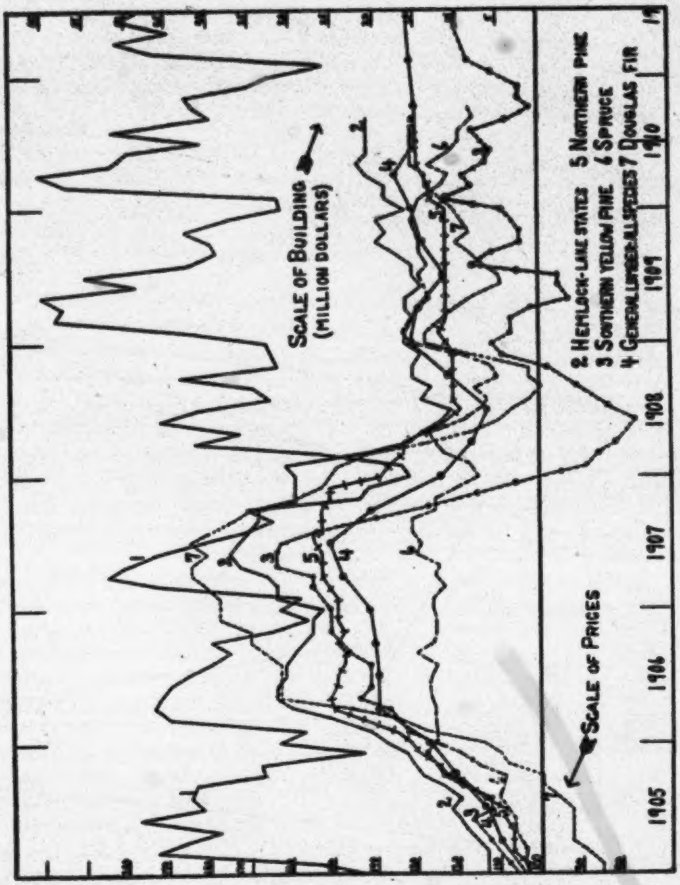

DIAGRAM 18.
Relation of Building Activity to Monthly Relative Prices of Dimension Lumber: 2"x4".

Lumber Price Phenomena since 1907.

The buildings erected in sixty-six identical representative cities of the United States[48] during each year since 1908 have exceeded in value those constructed during any preceding year. The annual production of lumber has probably not increased—if it has increased at all—as rapidly as during the preceding decade. While the annual output of lumber, since 1909, has remained approximately constant, the value of the buildings annually erected has slightly declined. The decline would be, doubtless, even more apparent were the building statistics discounted in proportion to the increase, during the period, in the value of buildings of identical construction.

Accurate and complete comparison of lumber output with the demand for building is, however, impossible. The annual production of lumber reported by the Census Bureau through the Forest Service has been,[49] in billions of feet board measure:

1899	35.	1909	44.5
1904	34.1	1910	40.
1906	37.5	1911	37.
1907	40.2	1912	39.1
1908	33.2	1913	38.4

The statistics for 1909 are conspicuously incomparable with those for other years not collected by the agencies of the decennial census.[50] The following record of building activity (in millions of dollars) in sixty-six cities should be considered in connection with the annual production of lumber and the movements of lumber prices in the United States as given in Appendix II:

	First 6 Months	Second 6 Months	Year
1905	296.2	302.4	598.7
1906	348.9	279.4	628.3
1907	318.6	242.3	561.
1908	224.5	289.7	514.2
1909	385.5	344.1	729.6
1910	354.9	312.4	667.4
1911	320.9	322.1	643.1
1912	350.2	330.3	680.5

The slow recovery of lumber prices since 1908 has been due in part to the influences tending to encourage caution and conservatism in enterprise throughout the United States;[51] in part to the policy of the railroads which are much the largest group of patrons of the lumber market; and in part, as is shown in the following chapters, to a substantial diversion of demand to substitute materials, superinduced by the high lumber prices of the period, 1904 to 1907.

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[48] Taken from the current files of Bradstreet's.

[49] Forest Products, Lumber, Lath and Shingles; annual reports by the Bur. of the Census, co-operating with the Forest Service.

[50] "The canvass of forest products in 1909 probably resulted in the most complete statistics on the subject ever secured." For. Prod. No. 2, 1909, p. 3.

[51] Com. and Fin. Chron., Vol. XCVIII, Feb. 7, 1914, p. 422. Building operations in New York City in 1913 were the smallest since 1903.

PRICES OF LUMBER AND OF OTHER BUILDING MATERIALS.

Among the widely used substitutes for lumber have been brick and other clay products, stone, cement and steel. In 1887 brick and stone were in wide use. Iron buildings were occasionally reported in the statistics of building. Steel construction was then practically unknown. During the succeeding period, however, the proportionate use of the substitutes for lumber has greatly increased. Steel car construction has threatened to deprive the lumber market of a previously *exclusive* demand. In the following diagram lumber prices are compared with the prices of agricultural products and of substitutes for lumber.[52] It is to be noted that the rise in the prices of farm products during the period 1908 to 1910 was approximately as rapid as that in the prices of lumber during the period 1904 to 1907.

General Influences Affecting Lumber Prices.

Not only in the United States has the operation of general influences upon commodity prices been manifested. Similar movements are observable in the price statistics of foreign countries. That the recent rise in the prices of lumber has not been confined to the United States is evident in the following table showing the movement of lumber prices in European and Asiatic markets.[53] The prices here presented for Europe and Japan have been reported by the Consular Service of the United States.[54] The same nominal items in different markets and countries are not comparable because of variations in grading and in nomenclature.

TABLE 8.

Increase in Prices of Lumber in Europe and Japan Between 1900 and 1910.

	Base Price, 1900	Increase, Per Cent
London:		
Best pine boards, per St. Petersburg standard..	$138.69	37.
Canadian 1st pine, per standard	107.06	67.8
Canadian 2d pine, per standard	76.64	47.5
Canadian 3d pine, per standard	57.18	33.6
American spruce, per standard	60.21	11.2
Pitch pine planks, per standard	63.26	15.4
Paris:		
Oak boards, small sizes, per cubic meter	15.24	2.7
Oak boards, medium sizes, per cubic meter	17.17	4.5
Oak beams and scantling, per cubic meter	22.96	9.8*
Pine beams and scantling, per cubic meter	13.51	7.2*

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[52] See also Appendix IV.

[53] See Appendix IV for a comparison of the relative fluctuations in the prices of lumber of different species and of substitutes for lumber in the United States and Canada, 1890 to 1912.

[54] "Wages and Prices Abroad," 61 Cong., 2 Sess., 1910, S. D., Vol. 46, No. 477, Pts. I, III, IV; esp. I, pp. 18 ff; III, p. 63; IV, p. 4.

Berlin:		
Pine boards, per cubic yard	4.35	11.3
Oak, sawed, Class 1	13.80	11.2
Marseilles:		
Pitch pine beams, per cubic meter	14.95	51.8
Oak, sawed, per cubic meter	34.73	33.1
Lyons:		
Pine, timber, per cubic meter	9.26	8.4
Pine, boarding, per cubic meter	11.58	8.1
Liverpool:		
Spruce boards, per St. P. standard	33.46	1.8
Redwood deals, per standard	92.46	18.4
Pitch pine prime deals, per standard	57.78	43.1
Edinburgh:		
Yellow pine (3x7), 1st quality, per standard	32.12	67.
Yellow pine (1x9), 1st quality, per standard	56.46	66.3
Pitch pine, prime boards, per standard	79.22	13.6
Yokohama:		
Pine, 1x1x12	2.46	24.
Cedar, 1x1x12	2.84	20.4
Oak, 1x1x12	5.50	31.8
Tokio:		
Pine, 1x1x12	2.21	37.9
Cedar, 1x1x12	2.71	24.4
Oak, 1x1x12	5.51	47.

* Decrease, see text.

INCREASE IN WORLD PRICES OF LUMBER.

The above comparisons indicate that, in general, the rise in lumber prices during the decade 1900 to 1910 has been a feature of the world markets. An apparent exception in the Paris prices of heavy dimension timbers has been explained, in part, at least, by the relatively high prices of these items in 1900, the base year (e. g., cf. Lyons). These prices were in part a reflection of the great building activity in Paris during that year. Different items in the same market and the same (nominal) item in different markets show increases for the period ranging between 1.8 per cent and 67.8 per cent. Many factors intervene, however, in any attempt to analyze exhaustively the international prices of lumber and of other forest products.[55] Among these are the character, extent and ownership of the forest resources of each country; the predominance of exports or of imports of lumber; the industrial characteristics of the people; geographic and climatic conditions; racial customs.

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[55] The Forest Resources of the World (Zon, R.), For. Serv. Bull. 83, 1910, pp. 5, 6; also American Lumber in Foreign Markets, Special Consular Reports, Vol. XI, Bureau of Statistics, Dept. of State, 1894, pp. 159, 167, 172, 176 ff.

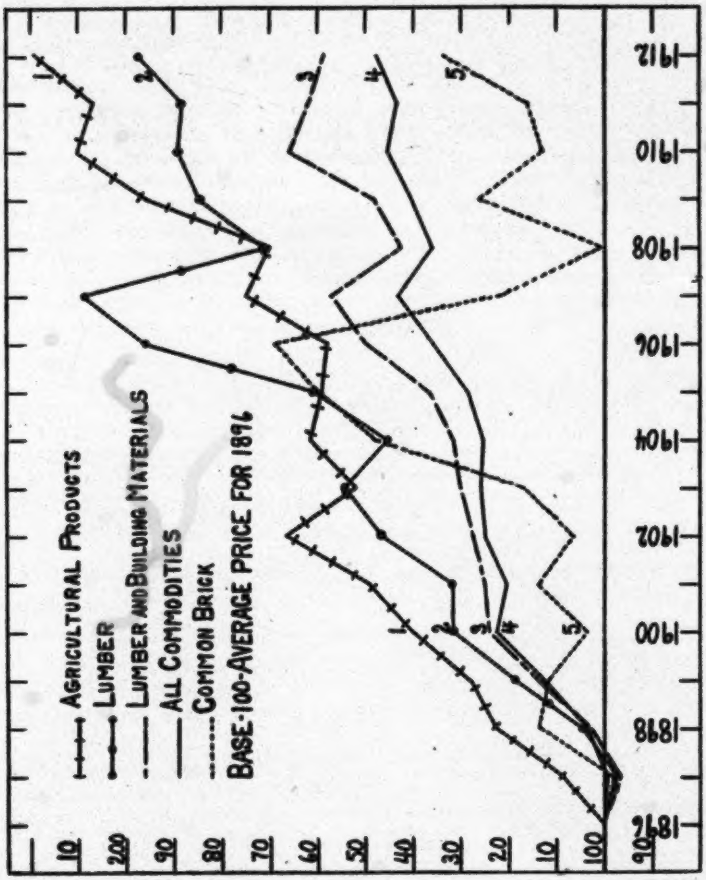

DIAGRAM 19.
Relative Annual Prices: Lumber, Agricultural Products and Substitutes for Lumber.

The prices of wood, both saw timber and firewood, in Great Britain and in the states of the German Empire, indicate that the general movement has paralleled, on a distinctly higher actual level, that of the prices of corresponding items in the United States.[56] The price of oak stumpage in Prussia has been recently estimated at three times, and in Württemberg at more than six times the average price of an even better quality of oak stumpage in the United States.[57] The prices of white pine timber (second growth) of New England approximated (1910) those of Scotch (Scots) pine in Prussia. They were but little more than one-third as high as the prices of similar timber in Württemberg.[58]

These excessive divergences have not, however, extended beyond *stumpage* prices. A much closer approach to uniformity, as between markets and between countries, has existed in the prices of the manufactured product, lumber. Beyond this generalization[59] a comparison of lumber prices in the United States with foreign prices has been impracticable without an investigation into local historical and static factors. Beyond the demonstration of a general decline in lumber prices before the middle nineties, and of an occasionally interrupted subsequent rise,[60] a comparison with foreign prices is of little interest. The world-wide operation, however, since about 1896, of a net price raising influence is manifested.

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[56] Forest Resources of the World, pp. 33, 34, 45.

[57] Ibid., p. 72.

[58] Ibid., p. 73.

[59] "The difference in the wood prices here and in European countries is very great indeed, but still they do not show the actual difference in the value obtained from timber in this and other countries. These [see text] refer only to the used part, which is much greater in Europe than here, and therefore the difference between the stumpage value per tree obtained in this country and abroad must be still greater." Ibid., p. 73.

[60] Bartholemew, J. G., F. R. S. E., The Atlas of the World's Commerce, 157 to 160.

CHAPTER VI.

THE INFLUENCES WHICH HAVE AFFECTED THE PRICES OF LUMBER: EDUCATIVE AGENCIES AND EXHAUSTION.

The sensitiveness of lumber prices to changes in the effective supply has been described. The readiness of their response to readjustments in current conditions of demand has been shown to have been quickened by the activities in recent years of associations and of trade journals in disseminating among manufacturers and distributors reports on current industrial, mercantile and financial conditions. A close approximation to a constant differential has existed between the prices for the same item in different markets. As the essentially producing regions have become more and more distinguishable from the consuming regions this differential has tended to become more stable. The range of prices in the same large market for similar items has been shown to have been narrower during periods of rising prices than during periods of price depression.

Methods of Accounting and Statistical Practice.

The practice of bonding large timber holdings characteristic of the period, since the early eighties, during which the center of lumber manufacture shifted from the Lake States to the South and to the West Coast, has revolutionized methods of accounting among manufacturers of lumber. Financial houses, before undertaking the flotation of bonds, have required a thorough invoice of the security and periodic reports on the status of the business and on the value of the security. The improvement has been marked, though there have yet remained careless practices and others wholly unsound in theory and misleading in their statistical applications.[1]

Before the inception of this period of bonding and in many sections thereafter, the books of lumber manufacturers were, judged by the more modern standards of accounting practice, notoriously ill-kept.[2] Invoices were often irregular and books once balanced were frequently discarded. Organization of manufacture and distribution was, on the average, as crude as were accounting methods. Standing timber, as long as it was plentiful, was not of enough importance in the estimation of its owner to justify the careful appraisal of its amount. The stand of merchantable timber in the United States was, therefore, unknown. Early estimates have proved to have been mere guesses.[8] The recent thorough investigation conducted by the Department of Commerce, since 1907, has given the only reliable data on this now vital subject.

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[1] Goodman, R. B., in Business and Lumber Trade Conditions, No. 33, Nov. 18, 1914, p. 1: "cost accounting has been carried to further refinements in the southern operations than in any part of the country."

Ibid., p. 3: "We believe that the future of the lumber business is *not in higher prices, but in greater efficiency; not in higher prices, but in more stable prices.* Full and open discussion of costs similar to the full and open reports on the prices obtained is what is most needed for efficiency and stability. The only warning is that too great care cannot be used in making a complete, instead of a partial and incomplete, tabulation of lumber costs."

[2] Before the days of a multiplicity of grades of lumber the requirements were comparatively simple. Standing timber was moreover of so little value that the owner had no great interest in knowing just how much he had. Bonding of timber was practically unknown. For example, in the Saginaw white pine district only three grades of lumber were known to the manufacturer, shipping culls, common and uppers. These were loaded, *mill run,* almost indiscriminately and shipped over the Great Lakes to a distributing point. There they were sorted. The northern pine manufacturers have since then distinguished, at the mill, over 375 different items and a multiplicity of grades.

The inadequacy of former estimates is well attested by an interesting fact: Since 1880, 200,000,000 M feet more of timber has been cut for manufacture into lumber than was estimated as the total stand in the United States in that year. Moreover, there yet remains standing over three times the amount of the estimate of 1880. The supply convenient to consuming territory has been relatively depleted. The chief distinguishing characteristic of lumber manufacture is thus the character, distribution and supply of its raw material. Merchantable stumpage has become the source and the end of vital modern forestry problems. But the dependable data cover only recent years. Conclusions of mathematical precision are, therefore, impracticable to the statistician.

Dynamic Influences on Lumber Prices.

The explanation of static changes and adjustments in the phenomena of lumber prices cannot account for the great historical price movements. The conspicuous long-time changes in price level indicate the action of dynamic influences. The course of general lumber prices as compared with the relative prices of all commodities has exhibited marked peculiarities. It is assumed that lumber prices have been affected by all general price influences and that these general factors are an adequate explanation of the historical phenomena of lumber prices *in so far only as such phenomena have coincided with similar phenomena, during the same period, in the movement of general commodity prices.* Peculiar phenomena, however, measured by the extent and by the direction of departure from the course of general relative prices, are assumed to have been due to peculiar influences, i. e., to causes not operative upon general commodity prices or not operative to the same degree.

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[8] Tenth Census, Sargent, 1880, 856,290,100 M feet. This estimate by Sargent does not include Douglas fir or western yellow pine, the former being the most important single species remaining.

Hotchkiss, in 1898, in "Lumber and Forest History of the Northwest," 1,400,000,000 M feet, of which 1,000,000,000 M feet stood in the Pacific States.

Twelfth Census, 1900, Gannett, 1,390,000,000 M feet. Of this 800,000,000 M feet was attributed to the "Western States." Fernow, B. E., in 1902, in "Economics of Forestry," p. 52, 2,000,000,000 M feet. To the "Western States" were attributed four-tenths of the total; to the "Northern States" one-fourth. The latter was a considerable overestimate.

Long, R. A., in 1903, January, at the 13th Annual Meeting of the Southern Lumber Manufacturers' Association, in a paper on "Stumpage," estimated 822,682,000 M feet of soft woods, a tremendous underestimate.

The American Lumberman in 1905, September, 1,970,000,000 M feet.

Forest Service, 1909, Kellogg, R. S. "The Timber Supply of the United States," Circular 166, p. 8, 2,500,000,000 M feet.

Bureau of Corporations, 1911, 2,800,000,000 M feet.

LUMBER PRICES AND GENERAL PRICES COMPARED.

The nature of the historical phenomena of lumber prices as compared with general prices has been indicated by Diagrams 1 and 11. For the period, 1860 to 1913, as a whole, covering 53 years, general prices fell from 126.3 to 121., or 4.2[4] per cent. For the same period lumber prices increased from 40.5 to 140.8 or 247.6 per cent. Between 1860 and 1873 general prices increased, net, to 169.3 (currency) or 34 per cent; lumber prices increased to 95.1 (currency) or 134.8 per cent. During this period the local manufacture of lumber for local use to a large extent disappeared. In the Eastern States the sources of manufacture receded into the more inaccessible parts of Northern Pennsylvania, New York and Maine. The center of the lumber industry shifted to the Lake States while the yellow pine industry of the South was prostrated by the war and during reconstruction.[5]

Thus during the period of the first great shift of the central source of lumber supply[6] to a more distant region the net relative increase in lumber prices was nearly four times as great as the net increase in general prices.[7] For this period descriptive data are inadequate. It should be noted, however, that the first instance of exhaustion of timber supply close at hand, as expressed in the radical shift in the centralization of the industry, occurred during a period when association price activities and attempts at artificial restraint of trade were practically unknown. Undoubtedly the remarkable relative increase in lumber prices during the early period was caused by natural influences. These influences may, however, have been, in part at least, abnormal because of the extensive industrial readjustments incident to the war.[8]

With the center of lumber manufacture established in Michigan, at a distance from the centers of lumber consumption, extensive timber tracts were opened to exploitation. Between 1873 and 1881, under conditions of abundant supply, the course of lumber prices has more nearly paralleled that of general prices.[9] In fact, during the three years following the panic of 1873 lumber prices fell more sharply than did average commodity prices. The lumber industry shared fully the subsequent depression.[10] But when, in the early eighties, production in Michigan began to decline[10] and the center of manufacture moved farther and farther west through the Lake region and finally in the nineties shifted to the southern pine belt, lumber prices again, as compared with general prices, tended to rise rapidly. The subsequent phenomena have been indicated in Diagram 1. There it is shown that the *direction* of the divergence of lumber prices from the average level for all commodities has been almost constant since 1880, i. e., toward a higher level for the former.

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[4] See supra, p. 78: these prices are relative; i. e., in terms of the average for base years, 1901 to 1903.

[5] See Diagram 5, p. 28.

[6] See Diagram 7, p. 33.

[7] I. e., 134.8: 34 (per cent) :: 4:1 (approximately).

[8] To avoid undue emphasis upon phenomena arising under abnormal conditions we have begun the more intensive analysis of lumber prices with the year 1880. Reference is made, however, to the earlier period (1860 to 1873) in the case of generalized tendencies of lumber prices; also where an analogy can be pointed to in the course of subsequent price movements.

[9] See Diagram 12, p. 82.

[10] 45 Cong., 2 Sess., 1877, 1878, Cong. Rec., Vol. 7, Pt. 1, p. 851.

The occasional interruptions in the continuity of the relative upward movement have ocurred, for the most part, during periods of insecurity in general financial conditions. Thus, after the panic of 1873 lumber prices fell rapidly. Again in 1888, 1893, 1900, 1903, 1904, 1907 and 1908, lumber prices are shown to have been more responsive to the influences of depressed market conditions that were average commodity prices. The sharp temporary decline in lumber prices during the latter part of 1900 is concealed within the average for the entire year shown in Diagram 1. A more correct impression may be had from the quarterly prices shown in Diagram 12.[11]

Influence of industrial depression. The very conspicuous relative decline in lumber prices during 1907 and 1908 was in great measure intensified by over-production, superinduced by the high prices of lumber during the preceding three years. During this period of general prosperity the productive capacity of the industry had grown to dimensions greatly in excess of the average normal requirements of the lumber market.[12] Enforced reduction of output caused by the collapse in demand during the depression occasioned considerable financial distress among many manufacturers, especially in the South, and to a less degree in the Pacific Northwest. The increased mill capacity, too confidently built upon the hopes inspired by general prosperity and by high prices, became an incubus upon the industry. To meet accruing obligations, as has been previously pointed out in this volume, enforced liquidation of assets through the offering for sale of larger quantities of lumber than the current demand would apparently justify, has contributed substantially to the decline in prices.

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[10] The Saginaw Valley was the first home of the white pine industry in the Lake region. An index to the degree of exhaustion there by 1880 is to be found in the decline in average quality of the logs cut. In 1860 first quality lumber was yielded by 75 per cent of the logs; in 1880 by only 10 per cent.
Stevenson, Wm., Wood: Its use as a constructive material. 1894 (London), p. 238.

[11] During the same year (1900) the decline from the highest to the lowest monthly relative prices of "all commodities" was 3.9 per cent. Bur. of Lab. Stat. Bull. 149, p. 19. The corresponding decline in lumber prices was 12.9 per cent. See App. IV.

[12] In the annual address of the president, delivered at the meeting of the West Coast Lumber Manufacturers' Association, Tacoma, Wash., January 30, 1914, the general situation in the lumber industry was commented upon: "The country at large should know and be familiar with some of our problems. They should understand that we have a great surplus sawmill capacity, which can at any time spoil good market conditions by overproduction. This fact given publicity should at least deter others from coming in and investing in an industry already overdone."

With the few exceptions noted, therefore, and these only temporary, the course of lumber prices since 1880, as portrayed in Diagram 1, indicates the operation of some powerful dynamic influence or influences in the direction of higher prices. These influences must have been continuous in their operation. They must also have been peculiar influences, i. e., in the sense that they were either not operative at all or were not operative to the same degree upon general commodity prices.

Analogy to lumber prices, 1860 to 1873. It is to be here noted, as is later pointed out in detail, that the recent investigation by the Department of Commerce, of competitive conditions in the wholesale distribution of lumber has been instituted on the assumption, here shown to have been erroneous, that the conspicuous recent rise of lumber prices *as compared to general prices, began in 1896 and 1897.* That the present movement, however, began in 1880 and 1881 has been shown in Diagram 1. (See also Appendix II.) Moreover, between 1860 and 1873, i. e., during the period in which occurred the first great historical shift of the center of lumber supply to a distant foreign source, there appeared the same phenomena of lumber prices, as compared to general prices, as those which have been recently under review by the Department of Commerce for the period since 1897. In fact, the average relative increase in lumber prices, i. e., as compared to general prices, during the period of the first general shift of supply sources, was more conspicuous than has been any subsequent relative increase.

The assertion is sometimes made that organized price activities of associations of manufacturers in attempted restraint of trade "have had and do have an *important* effect on the actual sale prices of lumber."[13] On the other hand, between 1880 and 1897, there was an equal relative rise in lumber prices as compared to general prices, although there was then little or no organization of wide influence among manufacturers to act in restraint of trade. There is but little evidence of the intervention, since, 1896 and 1897, of any "important" price-raising influence which had not previously been operative. If a "substantial" part of the relative rise in the prices of lumber since 1897 has been due to artificial organized price-raising activities, there can be no sufficient explanation of the previous and equal relative increase between 1880 and 1897.

Having described the range and the character of the price phenomena attributable to influences peculiar to the lumber industry, such influences are hereinafter discussed as follows:

First. Development of lumber trade journalism and of the educative functions of associations of manufacturers. This caption embraces the organized endeavors to place within reach of the lumberman such information as would enable him to secure "top" prices for his product and would promote uniformity in prices of identical items where a greater or less degree of promiscuity had previously prevailed.

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[13] The Lumber Industry, Pt. IV, p. 12; also p. xvii.

Second. Relative exhaustion of convenient timber supply.

Third. Increase in the use of substitutes for lumber.

Fourth. Attempts at organized artificial interference with the operation of natural price influences.

Educative Agencies in the Lumber Industry.

The influence upon prices of the development of trade journalism and of the educative activities of associations is incapable of precise estimation. That this service has been highly valued by the lumbermen themselves is evident. As has been pointed out, this has constituted a major function of the several associations, administered at considerable expense. Any manufacturer or distributor, whether he do or do not belong to any association, has had access through the lumber trade journals[14] to current information as to prevailing market conditions. His bargaining ability has been greatly strengthened. As a natural consequence, there is now much less promiscuity in prices.[15] Although there has developed no organized "lumber market"—such as has characterized, for example, the cotton industry—lumber "exchanges" have long existed as a part of the distributive mechanism in many large cities.

EARLY INTEREST IN TECHNOLOGY OF PRODUCTION.

After the Civil War, when the centers of lumber production steadily withdrew to a distance from the consuming markets, it was believed that mill prices of lumber lagged tardily behind the current fluctuations in the tributary markets.[16] Custom was then an important price determinant, an inheritance from the era, then disappearing, of local manufacture for local use. The lumber manufacturer was primarily interested in the achievement of the maximum of efficiency in the technology of production. To him the lumber industry was to be found in the logging camp and in the sawmill. The study of market conditions, of the competition of other species and of methods of extending his markets was a minor concern. This was the function of the distributing agents. Said a former Assistant Forester of the United States[17] in 1902:

> "In effective methods for the harvesting and manufacture of lumber the American lumberman has no superior, nor is he equaled in his disregard for the future of the forest which he cuts."
>
> Also, "In spite of steady improvement in tools, logging outfits and mill machinery all tending to cheapen the cost of lumbering, the price of lumber increases steadily and rapidly."

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[14] There are a great number of journals, weekly, bi-monthly and monthly, some devoted exclusively, others in part, to the interests of the lumber industry. Of these the American Lumberman has perhaps the widest and most representative interests. Its files and those of its antecedents have been extensively cited in this monograph.

[15] See supra, Diagram 3, p. 124.

[16] Committee on Finance, U. S. Senate, 53 Cong., 2 Sess., 1894, Sen. Rep., Vol. II, Nos. 444-446; 451; Bull. Nos. 27-30.

[17] Price, O. W., Influence of Forestry upon the Lumber Industry; in Dept. of Agric. Yearbook, 1902, p. 310.

STABILITY AND EFFICIENCY OF ORGANIZATION AND METHOD. The same writer commented upon the constant variations in lumber prices:[18]

> "The wide fluctuations characteristic of lumber values today is much more the result of conditions within the industry itself than of variations in the demand for the product of the forest. The uncertainty of available supplies, the lack of true proportion between stumpage values and lumber values, the speculative features which the industry now presents, have all tended to produce an exceedingly unstable and abnormal fluctuation in the prices of lumber, with a marked disposition toward rapid increase."

It has been toward the elimination of speculative elements and toward the greater stability and efficiency of organization that the influence of the educative activities has been extended. Fostered by the trade press, encouraged and promoted by the associations and accepted by manufacturers as a valuable business principle, thorough acquaintance with market relations has succeeded to the high position formerly occupied by expertness in technology. As a result the lumber industry has lost many of its former crudities. Dynamic changes in the conditions of the industry, especially in respect to the supply of timber, have led to the demand, so characteristic of modern manufacturing industry, for "efficiency" and "economy."[19] Today it may be said that the lumber industry on the whole is well organized and familiar with the best of modern business methods.

In this direction its achievements have been comparatively recent. Permanent organizations of manufacturers were unknown before the early eighties when first appeared the evidences of approaching relative exhaustion of the northern forests. Nor did the trade journals play a prominent part in the industry until much later. They have been partly the result and partly the cause of the historical influence which has resulted in greater *uniformity* of all prices of lumber. Probably the actual average level of prices has also been raised. What change in price level, however, is attributable directly to the influence of such educative activities cannot be determined with precision. In the elimination of purely static fluctuations their effect has been much more manifest.

Exhaustion of Timber Supply.

As a surplus of timber means only a relative surplus, relative, that is to demand, so exhaustion of timber supply can mean only relative exhaustion. If the total demand remain constant and the annual drain upon the forests be greater than the annual regrowth; or if annual growth equal the annual cut, i. e., if the physical quantum of available supply be a constant and the total annual demand increase, there is a relative exhaustion of supply, relative that is, to demand. The economic effect of either condition would be the same, although the latter condition might not, perhaps, be conventionally referred to as denoting exhaustion.

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[18] Ibid., p. 312.

[19] See Appendix V, p. 152.

The causes of the exhaustion of timber have been not only the cutting of stumpage for use in lumber manufacture. They have included also the uses of standing timber for other industrial purposes, the sacrifice of forests for the clearing of agricultural land and the fortuitous destruction of timber by fire and by insects and windfall. The manufacture of lumber is the chief industrial use to which standing timber has been devoted. For this purpose a high average quality of timber has been required. Other industrial uses have been the manufacture of shingles, lath, cross-ties and mine timbers, the production of pulpwood, tanbark, firewood, cordwood for chemical distillation, naval stores, posts, poles and fence rails, and miscellaneous uses connected with the various secondary wood-using industries. To a considerable extent, these have competed with the lumber manufacturing industry for the use of standing timber. On the average, however, the demands of these minor industrial uses have been satisfied by a grade of timber inferior to that which is suitable for manufacture into lumber. The by-products of lumber manufacture are now frequently absorbed by the secondary wood-using industries.

The sacrifice of forests for agricultural purposes has been the cause of the destruction of large stands of timber, especially in the central hardwood region. For a long time, standing timber was considered an encumbrance to the soil and as a menace to the development of agriculture. The rapid westward extension of the frontier has been the occasion of the systematic destruction of a large percentage of the original stand of hardwood stumpage in the United States. The insect scourge has destroyed much timber of valuable species, for example, chestnut. By far the most important of the non-industrial causes of the present condition of relative exhaustion has been the forest fires. While available data are incompetent to show the magnitude of the fire loss in the United States, it is well known that it has greatly hastened and accentuated the exhaustion of the eastern forests and that the fire hazard is still great in the privately owned forests of the West.

Character and Range of Influence.

But exhaustion means more than the mere reduction in the total quantity of standing timber. It regards also the quality of such timber and its location, i. e., its geographical relation to the consuming territory. For example, the shift of the center of lumber manufacture from the North to the South did not occur because it was hard for the lumber manufacturer in the Lake region to secure *timber*. It occurred because of the difficulty of securing timber of the high quality then required to meet the demands of the lumber market.

Exhaustion, therefore, in a scientific sense, means a condition of timber supply wherein it is more difficult than it has been at some preceding time, to get merchantable timber, i. e., timber suitable for manufacture into lumber, which is in location as convenient and as accessible to the consuming markets as that which the lumber manufacturer has been accustomed to use. To be more difficult means that it costs more. It costs more per unit to cut the timber and to carry the logs to the sawmill when the mill itself is not moved but when the logs which supply it come from a greater distance or from more inaccessible parts of the forest. In this case, the increase in cost is reflected in the price of sawlogs laid down at the mill. The mill itself remains in its previous geographical relation to the lumber market.

But, instead of going farther and farther away from the mill to secure his timber (or logs), the manufacturer may move to another timbered region (e. g., the shift from the Eastern States to Michigan; from the Lake States to the South). There he may secure his sawlogs at the mill at no greater, or perhaps, at even a smaller cost per unit than he had previously paid in his former location near to the consuming territory. But he is farther from the markets, and what he has saved because of lessened cost of standing timber, of logging and of delivery of logs to the sawmill, has been approximately equalled—and perhaps exceeded—by the increase in the cost, to him, of transporting his product, lumber, to the consuming markets where he has to compete with manufacturers of other species of timber or from other producing regions. That there is only approximate equality has been due to the interaction of dynamic forces—such, for example, as the continual increase in population and the continued projection of the center of lumber consumption toward the West. The geographical distribution, that is, of population, and hence of lumber consumption, has not remained constant. It has continually moved toward the West, thereby counteracting, in part, the economic disadvantage of the projection of lumber manufacture to the more remote regions of the Southwest and the West. Thus, for example, has the market for lumber originating in the far South and in the Pacific Northwest been greatly extended.

Extension of transportation facilities. Doubtless the most important, economically, of these dynamic influences has been the development of transportation facilities which have made accessible immense forest resources which, at the time of the shift from the Lake region to the South, had only a potential value, or rather, perhaps, a present value based only on anticipated distant future uses. West Coast timber has until recently had a value highly speculative. Until the recent period of rising actual lumber prices, much of the West Coast stumpage had no value whatever for present use, i. e., for immediate manufacture. Its value then consisted exclusively of individual owners' estimates of the uses to which contingent future developments were expected to give rise. Such estimates have been of course speculative. Moreover, the value of all timber withheld from the axe will necessarily continue to be more or less speculative as long as dynamic influences exist, which are capable of changing the conditions upon which such timber may in the future be converted into directly marketable products. The charge[20] of speculative holding of standing timber is therefore simply the plain admission of an inevitable economic fact.

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[20] The only issue in fairness is as to whether the United States or private owners should have done the speculative holding.

CLASSIFICATION OF INFLUENCES DUE TO EXHAUSTION.

"The exhaustion of the supply of virgin timber will lessen the chances for speculation and more closely restrict profits to those which arise from growing and manufacturing [as distinguished from simply owning] timber."[21] There are two ways in which exhaustion of timber has tended to cause an increase in the prices of lumber. First, through an increase in the cost of stumpage, logging and delivery to the mill. This effect is summed up in the higher price of logs "in the water," i. e., laid down at the sawmill. Second, through an increase in the average cost of the transporting the lumber from mill to market. This means that there has been an increase in the proportion of the lumber supply which has been marketed at a high transportation cost per unit.

A clear illustration of the operation of this principle may be found in the case of the Chicago softwood market to which northern pine has been shipped from Minnesota; yellow pine from Louisiana and fir from Washington. Formerly nearly all the supply came from the Lake States. When the industry shifted to the South, the lumber manufacturer paid there much less, on the average, for stumpage, logging and delivery to the mill than did his northern competitor. The latter, however, shipped his lumber to Chicago on a 6 to 10 cent rail rate per 100 pounds (or less by water), while the yellow pine producer had to pay 23 to 26 cents per 100 pounds. Recently the West Coast manufacturer has, on the average, produced lumber more cheaply per unit than the southern pine manufacturer, because of lower stumpage prices and the more economical methods of logging and delivery. To compete in the Chicago market, however, West Coast lumber has borne a rate of 55 to 60 cents per 100 pounds, or nearly $15 dollars per M feet.

CUMULATIVE EVIDENCE OF EXHAUSTION IN LEADING STATES.

Since the early eighties have marked the period during which lumber production in Michigan began to decline, the year 1880 has been taken as the starting point[21a] in the comparison of the cumulative evidences of exhaustion with the peculiar phenomena of lumber prices. See Diagram 1. In the following table the percentage distribution of lumber production since 1880 is shown for eighteen leading states. The order in which the states are named has been determined by dividing the percentage of the total cut in 1912 for each state by its percentage of the total production for the period, 1880 to 1907. The state showing the smallest quotient, as thus determined, has been given the position indicating the greatest exhaustion of timber supply, i. e., at the head of the list. This classification has been wholly arbitrary and in many cases has not well represented the facts. It is, however, as satisfactory, perhaps, as any other arbitrary order. That Michigan heads the list s due only to the obvious fact that prior to 1880 an advanced condiion of exhaustion had been already reached in New York, Pennsylvania, Ohio and Indiana.

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[21] Kellogg, R. S., and Zeigler, E. A., The Cost of Growing Timber, p. 4.

[21a] Southern pine had begun to compete with Lake States white pine in the central and eastern markets. 55 Cong., 1 Sess., 1897, S. D., Vol. 4, No. 40, p. 2.

TABLE 9.

Distribution of Lumber Cut by States: Percentage of Total Product.

	1880	1890	1900	1907	1880 to 1907	1909	1912
Michigan	23.5	18.	8.6	4.55	12.5	4.2	3.8
Indiana	5.06	3.16	2.95	1.25	3.	1.3	1.
Pennsylvania	9.6	8.92	6.65	4.3	7.3	3.3	2.5
New York	6.5	3.86	2.5	2.1	3.3	1.5	1.3
Wisconsin	8.54	11.6	9.65	4.96	9.4	4.5	3.8
Ohio	5.02	2.36	2.82	1.31	2.7	1.2	1.3
Minnesota	3.1	4.55	6.66	4.13	5.1	3.5	3.7
Georgia	2.49	2.4	3.73	2.12	2.9	3.	2.4
California	1.66	2.16	2.1	3.34	2.3	2.6	3.1
Texas	1.81	3.52	3.46	5.55	3.7	4.7	4.9
Alabama	1.39	2.46	3.13	3.4	2.7	3.8	3.5
Arkansas	.95	2.24	4.62	4.95	3.5	4.7	4.7
North Carolina	1.34	2.15	3.66	4.03	3.	4.9	5.6
Oregon	.98	1.86	2.09	4.06	2.3	4.3	4.9
Mississippi	.93	1.9	3.44	5.2	3.	5.8	6.1
Washington	.88	4.45	4.07	9.4	4.8	8.7	10.5
Louisiana	.74	1.26	2.89	7.4	3.1	8.	9.9
Idaho	.1	.11	.19	1.27	.3	1.5	1.8

These figures considered in connection with Diagrams 5 and 6 clearly show the manner in which, coincident with the cutting out of the virgin timber in the East and the North, the market has turned for its lumber to the forests of the South and the West. For the period between 1880 and 1907, when lumber prices reached a maximum, the percentage distribution of the total production among geographical divisions was as follows:

Lake States (and Iowa[22])	27.
Southern States	27.4
Pacific States	10.3
Eastern States	11.4
Central States	14.8
Northeastern States	6.6
Rock Mountain and Prairie States	2.5

Exhaustion of important species. Because of the close association of different species of lumber with certain geographical regions, the historical movements indicated in the following diagram correspond in general with those depicted in Diagram 5. The percentage distribution of the production of lumber of individual species is shown for the period

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[22] Lumber manufacture accredited to Iowa has been almost wholly of logs floated down the Mississippi River system from Wisconsin and Minnesota. For. Prod., No. 2, 1911, p. 10.

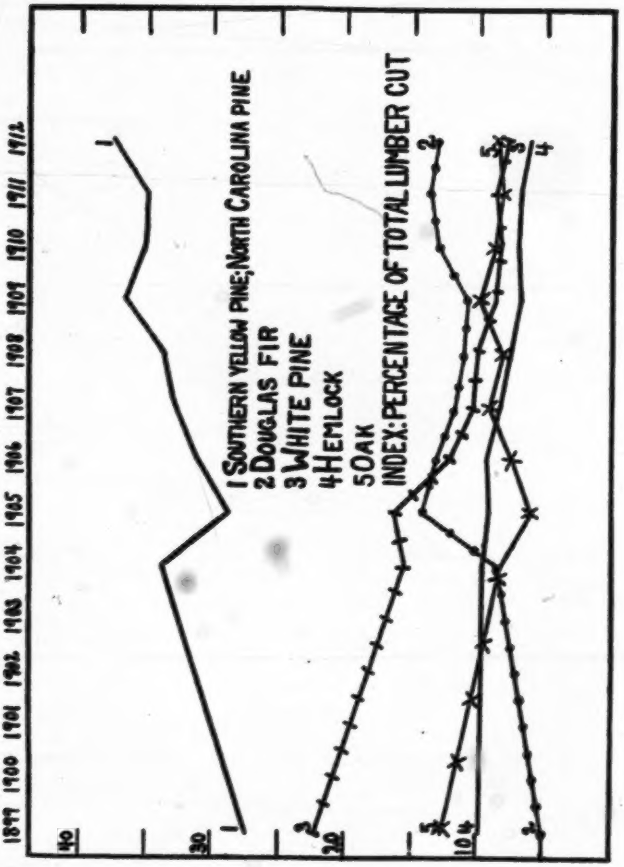

DIAGRAM 20.
Distribution by Species; Percentage of Total Annual Lumber Product.

since 1899.[23] 1 yellow pine; 2 Douglas fir; 3 white pine; 4 hemlock; 5 oak. These were the five leading species in both 1899 and 1912; they constituted 77.1 per cent of the total production in the former year and 73.5 per cent in the latter. During the fourteen year period the relative production of white (northern) pine has declined 63.7 per cent; of hemlock 36.7; of oak 33.4; of spruce 23.8 per cent. Douglas fir has, however, increased 164 and yellow pine 35.2 per cent.

RELATION OF LUMBER PRICES TO EXHAUSTION.

The most convincing evidence of the connection between exhaustion of timber supply and high lumber prices is to be found in the coincidence in time between the appearance of the peculiar lumber price phenomena, about 1880, described in Diagram 1, and the first considerable indications of exhaustion in the Eastern Lake States region. The universality and continuity of these phenomena throughout the United States are in themselves additional proof of this connection. That the influence of relative exhaustion is an adequate explanation of the peculiar extent of rise in lumber prices is, furthermore, attested by two facts:

> First, that in Canada, where the conditions of supply and of production, as well as the habits of inordinate consumption, have closely corresponded to those characteristic of the United States, almost identical price phenomena are observable. For these no general explanation has been advanced other than the postulation of: a. increase in stumpage prices; b. shift to distant sources, e. g., to British Columbia forests; c. increase in the cost of production of lumber.
>
> Second, no other general influence has been demonstrated which can account for the price phenomena nor for any substantial part thereof.

UNIVERSALITY OF INFLUENCE OF EXHAUSTION UPON PRICES.

It is clear that not the whole, nor, on the average, even the larger part of the rise in the price of lumber of any single species has been due to exhaustion of the supply solely of that particular species itself. If this had been the chief cause, the great rise in yellow pine, North Carolina pine, and especially West Coast lumber prices, would have been inexplicable. The increase has been due rather to exhaustion of the supply and to the consequent higher prices of other species with which they have competed in the large central markets. Those species of more abundant supply have operated as an actual or a potential check to an increase in the prices of the less plentiful competing species. This principle is illustrated in Diagram 13. Prices of white pine, for example, so increased during the eighties and nineties that the more remote yellow pine regions were enabled to compete in common markets. Any subsequent rise in white pine prices was appropriated also by its competitor.

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[23] The census figures upon which this diagram is based have been taken from the following sources: 1899, 1904, 1906, Forest Service Bull. 77, pp. 12, 15; 1905, same, Bull. 74, p. 11; 1907, Forest Products, 1907; 1908, 1909, same, No. 2, 1909, p. 15; 1910, same, No. 2, 1910, p. 9; 1911, same, No. 2, 1911, p. 7; 1912, Lumber, Lath and Shingles, 1912, p. 10.

In such a case the *relative* increase in yellow pine prices was greater than that in white pine prices, since the previous prices of yellow pine, in order to compete, has been necessarily much lower than those of white pine. An equal addition to a lower base price therefore resulted in a more conspicuous relative rise among the cheaper (i. e., other things being equal, the species most distant from the market) woods.

The phenomena exhibited by Diagram 13 are in general such as would be the logical result of competitive prices under general conditions tending to raise the prices of those species which have the cheapest access to the competitive markets. Apparent exceptions or anomalies may be adequately explained by the peculiar conditions attending the production or distribution of individual species, as described in Chapters II. and III. The influence of differences among the manufacturers of different species of lumber, in the average financial strength, is especially noticeable.[24] It is thus apparent that the relative rise or decline in the prices of the cheaper woods have been more radical than the coincident fluctuations in the higher priced species.[25] The sharpest upward and downward price movements (see Diagram 13) have been for Douglas fir, southern yellow pine, North Carolina pine and hemlock.[26]

Hemlock an apparent exception. Hemlock has been an apparent exception to the principle above stated, since it has had cheap access to the central markets. Its very sharp relative rise has been due, however, to the fact that until comparatively recent years despite its nearness to the market and despite a considerable degree of exhaustion it has continued on a low price level.[27] This fact has several explanations, both psychological and objective:

> "Hemlock lumber has always been sold at a lower price than northern pine because of a certain prejudice against it."[28]
>
> The course of hemlock prices "follows very closely that of yellow pine, of which it is a direct competitor * * * . Hemlock, however, being the cheaper, and, on the whole, the inferior wood, cannot expect to sell in considerable quantities on even terms with yellow pine. Yet its cost of production, including stumpage, is nearly that of the southern wood."[29]

Hemlock has thus been considered as of physically inferior quality and, typically, as simply a substitute for other species. Because of its proximity to the markets the "cost of production, including stumpage" of hemlock would otherwise be normally greater than that of yellow pine.

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[24] See supra, p. 61. It will be recalled that the majority of the prices entering into the determination of the curves given in Diagram 13 are either mill prices or prices at convenient basing points.

[25] Compare the relative fluctuations of the items having a low base price with those having a high base price in Appendix III.

[26] The hemlock market has been heavily influenced by the demand for hemlock tanbark. See A. L., July 13, 1901, p. 12; same, Dec. 31, 1904, p. 71; St. L. L., Aug. 15, 1908, p. 81.

[27] See Appendix III, Columns XV, XXVII.

[28] M. V. L., Aug. 30, 1907, p. 22.

[29] A. L., Jan. 25, 1908, Wausau.

This public under-appreciation of hemlock lumber has been recently substantially eliminated with the aid of educative advertising by the trade press and by the hemlock associations.

> "At least four-fifths of the remaining hemlock stumpage in Pennsylvania is controlled by the tanning companies. These companies permit cutting hemlock timber only as fast as they require the bark for tanning purposes, and therefore the hemlock output of the State is gradually diminishing until it hardly keeps up with the demands of the trade."[30]

This condition of production in Pennsylvania has tended to raise the price of the competing Lake States hemlock.[31]

For the very pronounced rise in hemlock prices immediately prior to 1907, another condition has been in large part responsible. As early as the latter months of 1904 many of the Western railroads diverted the use of their cars from lumber traffic to the grain carrying trade. The hemlock and northern pine market thus profited at the expense of yellow pine and West Coast lumber.[32] Similar uncertainty in the shipments of western and southern lumber in 1905 benefited the hemlock market.[33] Throughout 1906 a car shortage prevailed in the West and the South, so that much of the immediate business was diverted to northern pine and to hemlock.[34] But northern pine was scarce. Trade was exceptional in hemlock lumber which, until normal competitive conditions were reëstablished, invaded consuming territory accustomed to supply by West Coast or by Southern mills.[35] When the general business depression in the latter part of 1907 put an end to the car shortage, western and southern lumber reassumed their normal marketing territory. A radical decline in hemlock prices ensued.[36] These factors reasonably interpreted are perhaps an adequate account of the apparently exceptional hemlock phenomena shown in Diagram 13.

Cheap and high-priced species compared. The steadier price curves (i. e., those less subject to violent fluctuation), conversely, are those of the relatively high-priced woods. These include white pine, spruce, oak and cypress. Oak lumber as representative of the hardwood market, has been competitive only indirectly with the softwoods. Cypress, though actually a deciduous species, is economically a softwood. Because of peculiar physical properties, making it for certain uses, non-competitive, and because of the strength of ownership of the timber, cypress lumber has commanded a high price and has successfully resisted price depressing influences. This has, however, been at the expense of current sales. Moreover, there had been a remarkable rise in cypress prices prior to 1900. Since, therefore, the base price (1901-1903) is high as compared to that of other species, the subsequent increases as shown in Diagram 13 are the less conspicuous. The curve for white pine shows in reality the prices of "northern pine." Of this only the highest grades are of pure white pine. In the medium and lower grades there has been an increasing admixture of Norway pine and of other inferior species, e. g., jack pine, tamarack, balsam. In "northern pine" dimension items, white pine now rarely appears. The obvious steadiness in price is characteristic of a species of very limited supply, in the hands of manufacturers financially able to hold their lumber in their yards instead of being forced to meet the low prices of competing woods, as for example, in 1907 and 1908.[37]

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[30] A. L., July 13, 1901, p. 12.
[31] N. Y. L. T. J., Sept. 15, 1909, p. 31.
[32] A. L., July 2, 1904, p. 65.
[33] Same, Aug. 26, 1905, p. 66.
[34] M. V. L., Aug. 31, 1906, Minneapolis news.
[35] W. C. L., Apr., 1906, Minneapolis news. Al. L., Mar. 23, 1907, Minneapolis news.
[36] M. V. L., Nov. 1, 1907, pp. 34, 35.

Continuity of Phenomena of Exhaustion.

The universality of the influence of exhaustion upon the prices of competing woods has been shown. Relative exhaustion of a single species has tended to increase the price of lumber of all other species with which it has competed.[38] Continuity of the phenomena of exhaustion is so obviously and conclusively indicated by the statistics of Table 9, that discussion of it is unnecessary. Similar continuity in the peculiar lumber price phenomena has been indicated in Diagram 1. The significance in the analysis of price influences, of the coincidence in time of the peculiar phenomena of timber supply and the peculiar phenomena of lumber prices, has been already suggested.[39]

Coincident Lumber Price Phenomena in Canada.

The prices of actual sales of lumber in Canada taken from invoices, have not been available. The only index to the movement of lumber prices has been that issued by the Department of Labour of the Dominion of Canada. The constituent items have been described in the key to the table of relative prices in the United States and Canada in Appendix IV. Since the items included have generally corresponded and since the methods and sources of price statistics have been similar, Canadian lumber prices are there compared with prices in the United States, derived from the Bureau of Labor Statistics index for "Lumber and Building Materials." Since the items included in the two indices are equally representative and the methods and sources of price collection have been almost identical, a direct comparison has been possible. A remarkable agreement in price movements in the two countries since 1890 is manifested.

Similarity of conditions of manufacture. As between the United States and Canada the average cost of production of lumber has been nearly equal. The cost of woods and mill labor has been, perhaps, somewhat lower in Canada, but the higher prices of machinery and equipment have approximately balanced the equation.[40] That the tariff which, except during the period 1894 to 1897 and again recently since 1909, has been $2.00 per M feet on lumber, has substantially affected neither imports nor prices, has been shown in Chapter I. Certain border mills only have been able to compete in American markets. Moreover, large quantities have been imported from the United States.[41] The per capita lumber production in Canada in 1909 was 468 feet; in the United States 484 feet.[42]

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[37] A. L., Jan. 4, 1908, pp. 27, 55.

[38] See Business and Lumber Trade Conditions, No. 33, Nov. 18, 1914, p. 1.

[39] See supra, p. 119.

[40] This question has been thoroughly discussed at each successive tariff hearing. Volumes of evidence have been submitted to show that the cost of production is greater in the United States; equally convincing statistics to the contrary have also been presented. The fact is perhaps an unsettled question. Whatever difference exists, however, is not, on the average, a substantial one.

Average stumpage prices in British Columbia have been slightly lower than corresponding prices in the Pacific Northwest. In neither territory, however, until about 1900, have the prices of standing timber, as an item of cost of production, been of any considerable consequence. Nor is there evidence that in the Ottawa Valley and in the eastern Canadian forests the Canadian manufacturer has had any appreciable advantage in respect to this item of cost. An investigation by the Department of Commerce, in 1914, of conditions in the lumber and shingle industry in the Pacific Northwest showed "that there is practically no difference in the cost," i. e., of production, as compared with the cost to Canadian mills.[43]

SIGNIFICANCE OF CANADIAN LUMBER PRICE MOVEMENTS.

The timber resources of Canada have never been "cruised" and current estimates have varied. If on a conservative basis the remaining supply be placed at one trillion feet[44] or at about one-third of the remaining stand of merchantable stumpage in the United States, it is obvious that the degree of exhaustion in Canada as a whole has been considerably less than in the United States. For example, the production of lumber in Canada equalled, in 1909, only 8.6 per cent of that of the United States. Assuming 10 per cent as the average relation, it is apparent that the United States has been cutting ten times as much lumber from a total timber supply less than three times as great. The relative exhaustion in the United States has therefore been increasing at a rate more than three times as fast as in Canada. Costs of production have increased, but the relative increase, as has been seen, has been almost identical in the two countries.

There has been, moreover, no evidence that artificial interference in Canada with the operation of natural influences has perceptibly affected prices. A few isolated attempts at combination in restraint of trade in lumber have been uncovered by the Dominion courts. None have had any success. Nor has any part of the rise in lumber prices been ever authoritatively attributed to such artificial influences. Nor has any influence not also operative in the United States been proposed to account in whole or in part for the great advance of lumber prices in Canada.

Prices in the United States and Canada compared. Nevertheless, the course of Canadian lumber prices since 1890 has been almost identical with the contemporary lumber price movements in the United States.

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[41] E. g., 1909, 119,548 M feet; 1910, 176,736 M, and 1911, 392,733 M feet.

[42] See supra, p. 26.

[43] Special Report, Bur. of Cor., Feb. 16, 1914, p. 33.

[44] Zon, R., in Forest Resources of the World, p. 16, estimates 360 billion feet. This is, however, absurdly low as it covers only 280,000 square miles or less than one-fifth of the actual forest area of Canada.

See Appendix IV. For example, the relative prices of lumber in the United States and Canada have been as follows:[45]

	1890	1897	1900	1907	1911	1912
United States	84.1	77.	94.5	137.2	135.8	140.
Canada	84.9	77.1	93.6	135.6	135.5	136.4

The difference also between relative lumber prices and general prices, i. e., the range of peculiar lumber price phenomena, has been almost equal in the two countries. General commodity prices are compared as follows:[46]

United States	101.1	80.3	99.	115.9	115.6	119.4
Canada	101.4	84.7	99.5	115.9	117.	123.4

Thus the relation of lumber prices to general commodity prices has been practically identical in the United States and in Canada. Analogy to Canadian price phenomena constitutes strong presumptive evidence that natural causes, of which much the most influential has been the relative exhaustion of timber supply, are an adequate explanation of the lumber price movements in the United States for the period for which statistics have been presented, 1880 to 1912.

Analogy to Canadian export prices. Further confirmation is to be found in the record of export prices of Canadian square timber.[47] Not only has the increase been continuous, but it has exhibited a wide range of relative increase as between different grades of product. The relatively greater reduction in the supply of high grade timber is manifest in the higher percentage of increase in its price as compared with that of the lower grades. The following table[48] shows not only that the annual relative rise in price since 1880 has not been greater than that between 1850 and 1880, but that it has, in fact, been less. Neither general influences affecting all prices during this period nor any assumption of artificial restraints can account for these phenomena.[49]

TABLE 10

	(cents per cubic foot) White pine	Oak
Year		
1850	4 to 5.5	13 to 14
1860	5.5 to 10	14 to 17
1870	8.5 to 18	19 to 23
1880	14 to 36	43 to 52
1890	18 to 35	42 to 49
1894	16 to 42	45 to 51
Increase	12 to 36	32 to 37
Per cent increase per annum approximately	7 to 15	5 to 6

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[45] The base price (100) here is the average price for the three-year period, 1901 to 1903, as used throughout this study.

[46] For complete index for the period 1890 to 1912, see Appendix IV, p. 151.

[47] Exported chiefly to England where lumber prices have long been notably high.

[48] Data from Forest Wealth of Canada, quoted in Fernow, B. E., op. cit., p. 459.

[49] During the period 1878 to 1893 the prices of white pine logs exported from Ontario to the United States increased from $5.40 to $8.33 or at the average annual rate of 3.6 per cent. This was a period of declining general prices.

ANALOGY TO PRUSSIAN PRICES.

An exhaustive analysis of the historical movements of prices of wood and of agricultural products in Prussia covering the period 1830 to 1880 has been made by Dr. Fr. Jentsch.[80] His investigation revealed the following facts:

1. The prices of agricultural products and of wood have tended to rise.
2. The rise in wood prices has been more continuous and more extensive than that in agricultural products.
3. Wood prices promise to rise indefinitely.

These observations have concerned the general commodity, wood. The price tendencies in Prussia of the specific wood product, lumber, have been much more pronounced. Indirectly, Prussian experience has confirmed the validity of the principle of lumber price fixation derived above from the analogy between the statistics of lumber prices in the United States and in Canada.

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[80] Zeitschrift für Först-und Jagdwesen, 1887, pp. 91-108.

CHAPTER VII.

THE INFLUENCES WHICH HAVE AFFECTED THE PRICES OF LUMBER: SUBSTITUTION AND ASSOCIATION ACTIVITIES.

Substitution of Competing Materials.

Not only has there been keen competition, for most uses, between different species of lumber in the same markets, but also between lumber and substitutes for lumber. The diversion of demand from one species of lumber to another implies no necessary change in *general* lumber prices. Its transfer, however, to a substitute material thereby tends to diminish the total demand for lumber as balanced against the total offering of it upon the market and therefore the price.

Definition of Substitution.

Substitution, as conceived in this study, means not a physical diminution in the total uses of lumber at one period compared with a previous period. It means a *relative* diminution, i. e., a smaller total of uses at any time as measured by the current demand for lumber, than there would have been had the proportional distribution of demand among competing materials remained the same as it had been at a former time, with which present conditions are being compared.[1] The first meaning, i. e., signifying an actual quantitative diminution in the total uses for lumber, seems to have been that adopted by Fernow in the assertion:[2]

> "Whatever the reasoning regarding the possible substitution of other materials for wood, the historical evidence so far has been the other way: new and more extensive use of wood has accompanied the development of these other materials.
>
> "The increase of wood consumption parallel with the increase of consumption of its substitutes, coal, iron, and stone, simply accentuates the influence of the great modern industrial development and increase of civilization, which means increase in wants."

That per capita utilization of lumber has greatly increased has been already shown.[3] But that the per capita use of substitutes has increased may be demonstrated with equal conclusiveness.

Substitute Building Materials.

Since building and general construction uses have comprehended nearly three-fourths of the average annual output of lumber, it is there that substitution has exercised the greatest influence upon the total demand for lumber. That the per capita use of substitutes in the United States, during the period of rising lumber prices, since 1896, has increased much more than the per capita consumption of lumber is apparent in the following diagram:[4]

---

[1] At least that the *proportion* of demand going to lumber shall not have decreased.

[2] Economics of Forestry, 1902, p. 424.

[3] See supra, pp. 26, 27.

The annual product of building stone has nearly doubled in value since 1900; that of crushed stone has increased 340 per cent.[5] Statistics collected by the Forest Service show that the consumption of box lumber between 1907 and 1910 had declined 15 per cent;[6] that about 10 per cent of the shipping boxes manufactured in 1911 were of fiber, and that

> "the wooden box is not quite holding its ground,"[7]

in competition with fiber.

Influence of Substitution Upon Prices.

Increasing substitution of other materials may have affected the lumber market in two ways:

> First, it may have tended to cause a decrease in the amount offered for sale, leaving the ratio of demand to supply, and tending therefore to leave the price also unchanged.
>
> Second, it may have tended to decrease the price by decreasing the total demand for lumber, but not the supply in equal proportion.

The exercise of an influence of the first type would not have been the cause of a decline in prices. Its indirect influence would have been in the direction of lower prices because of the decrease in the current demand upon the resources of standing timber,[8] and because of the cumulative effect of such savings in lessening the degree of exhaustion of those sources from which the current supplies of lumber have been drawn. The second effect, however, has tended directly to lower prices by diverting the demand.

Diversion of demand since 1907. It is considered by many manufacturers[9] that the slow recovery of general lumber prices since the fall of 1907 has been largely due to the inability of the lumber market to

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[4] The data include domestic production plus imports. Exports have been deducted. Sources: Annual bulletins of U. S. Geological Survey: The Cement Industry in the United States; The Production of Sand and Gravel; Statistics of the Clay-Working Industries; The Stone Industry. American Iron and Steel Association [Institute] Annual Statistical Reports.

Key: Each vertical space represents:
Cement, 5,000,000 barrels.
Structural steel, (and iron), 200,000 tons.
Glass sand, 200,000 tons.
Common brick, 2,000,000 thousands.
Front brick, 200,000 thousands.
Vitrified brick, 200,000 thousands.

[5] The Stone Industry in 1912, pp. 10, 11.

[6] For. Ser. Circ. 177, Wooden and Fiber Boxes, 1911, p. 11.

[7] Ibid., p. 13. It is not true, as many lumbermen and box manufacturers have asserted, that the increasing use of fiber has caused a decrease of 30 to 40 per cent in the demand for wood boxes. p. 5.

[8] See supra, p. 23, note 81.

[9] E. g., see Appendix V, p. 152.

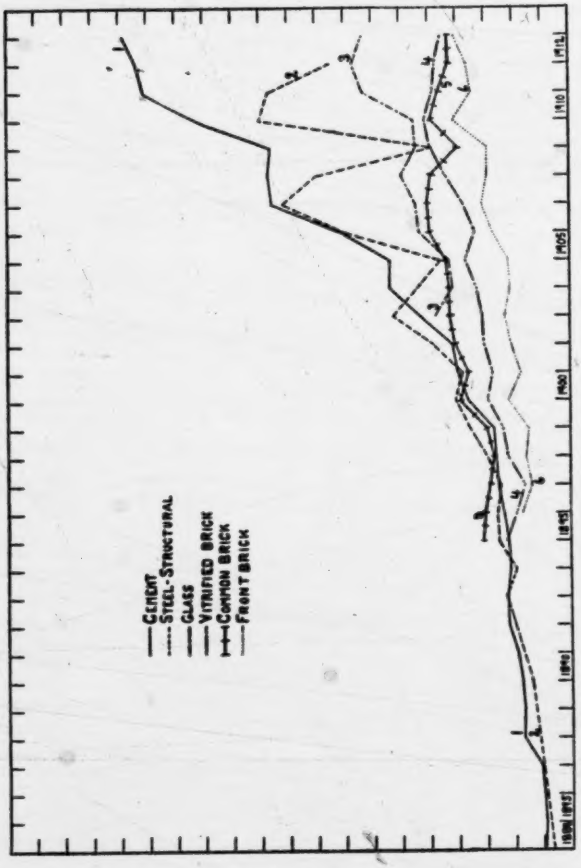

DIAGRAM 21.
Consumption of Substitutes for Lumber in the United States.
(Scale: Each vertical division (see marginal index) represents: cement, 5,000,000 barrels; structural steel, 200,000 tons; glass sand, 200,000 tons; vitrified brick, 200,000 thousands; common brick, 2,000,000 thousands; front brick, 200,000 thousands.)

regain that part of the demand which has been diverted to competing substitutes because of the high lumber prices prevailing during the period 1905 to 1907. The precise range of price phenomena due to increased substitution is, of course, incapable of isolation. That its influence has however been recognized as an important factor by the lumber trade is a presumptive indication of its probable past effect upon prices.[10] Undoubtedly the still greater potential increase in substitution has been a deterrent influence upon the prices of lumber for certain specific uses in which the slack permitted by the competition of other materials has been already entirely, or approximately, absorbed. At a higher price, the demand for lumber would have been to a greater extent or, in some cases, entirely, diverted to competing materials.

Organized Artificial Restraints Upon Competition.

The type of manufacturers' organization and the general policy of co-operation has been described in Chapter III. Economies due to the great technological improvements in the processes of lumber manufacture from stump to market, balanced against the increase in cost of labor and of equipment, have resulted in a great net increase since 1894, in the cost of production per unit of output (exclusive of the cost of stumpage). A similar increase in costs has, however, characterized, in general, all other industries.

In the investigation of "Wages and Prices" by the United States Senate in 1911 it was reported:[10a]

> "It is not to be denied that aside from all other causes the cost of lumber has been increased by the diminishing supply of standing timber, but it is equally true that, as in the case of the farmer, so in this case of lumbermen the cost of the product has been largely increased by the enormous increase * * * on almost all articles used by him in the prosecution of his business and in the clothing and supplies needed by himself, his family, and employees."

The increase in the unit cost of lumber production has been classified[11] above as a result of a universal influence affecting general prices; not, therefore, as an explanation of that part of the increase of lumber prices which has been over and above the increase in general prices.

NATURAL INFLUENCES ADEQUATE EXPLANATION OF PRICES.

Neither taxation of timber nor the tariff has had substantial effect on average lumber prices. Nor have there been, since 1880, any considerable increases of wide application in lumber freight rates. As respects transportation costs, the increases in lumber prices have been due to the great continuous increase in the proportion of the lumber output taking the higher rates (i. e., from distant sources); not to changes in the rates themselves. As an influence, distinct from general relative exhaustion of supply, tending to raise lumber prices, concentration per se in timber holding in certain regions has not been effective in the past, either directly or indirectly. It is, however, a powerful potential factor, the true significance of which is dependent upon future exigencies of the timber supply.

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[10] For relative prices since 1890 of substitute building materials, see App. IV.

[10a] 61 Cong., 3 Sess., 1911, S. D., Vol. 63, No. 847, Investigation of Wages and Prices, Vol. I, p. 148: minority report.

[11] See supra, p. 2.

Educative activities within the industry have resulted in more uniform prices and probably in a slightly higher average level. Any such increase has been due, however, to the better bargaining ability of the well-informed seller of lumber as contrasted with that of the owner of lumber who is unacquainted with current market conditions. The relative exhaustion of timber supply has been a universal and a continuous influence upon the prices of lumber. The phenomena of high prices and of diminished supply of timber in the United States have been so correlated as to reasonably indicate a causal connection. By comparison with Canada and with other countries, and by analogy to other periods in the history of the industry in the United States, the explanation of the peculiar extent of the relative rise in lumber prices since 1880 has been found in natural causes, i. e., in factors beyond the control of producers or of associations of producers. The task yet remains to show that the organized activities, as such, of lumber manufacturers, aside from the legitimate exercise of their educative functions, have had no substantial effect in the direction of higher wholesale prices.[12]

GENERAL RESTRAINT UPON COMPETITION IMPRACTICABLE.

There have been five primary objective conditions preventive of general restraint upon competition in the wholesale distribution of lumber:

1. Wide geographical distribution of raw material;[13]
2. Scattered ownership of timber; existence of many small holdings.[14]
3. Large scale production, i. e., in very large plants, not the basis of most economical adjustment of productive factors.[15]
4. Actual and potential competition among different species for nearly all uses to which lumber has been devoted.[16]
5. Actual and potential substitution of other materials competing for the same uses.[17]

Certain psychological influences have also tended to make ineffective any general attempts at such co-operation. The lumberman's traditional, and perhaps partially sentimental, interest in the technology of production rather than in the details of marketing; mutual distrust engendered by the violation, by some, of principles of trade ethics, the "common law" of the industry; individual self-reliance as expressed in independent action, believed to best promote individual interests—these factors have discouraged effective joint action in respect to the distribution of lumber. To a great extent such subjective factors have now been eliminated. For this the educative activities of the trade journals and of the associations themselves have been primarily responsible.

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[12] It is recalled that the scope of this study does not extend to retail distribution.

[13] See supra, pp. 26, 27.

[14] See supra, pp. 84 to 87.

[15] See supra, pp. 39, 40.

[16] See supra, pp. 41, 42.

[17] See supra, pp. 126, 127.

Erroneous interpretation of price phenomena. Many manufacturers, prominent in association activities, have aspired to a type of co-operation among lumbermen, sufficient to dominate the lumber industry.[18] Associations have campaigned vigorously for increased membership. Extravagant, fanciful claims as to the results attributable to joint action have been offered as inducements. For example, a large yellow pine manufacturer, commenting on the effect upon prices of a curtailment of production during the latter part of 1904, attributed the observed result wholly to the influence of organized activities by the association:

> "* * * In making my calculations as to the saving that this curtail movement has effected to my company, * * * [I found that] we obtained about $145,381 more for our shipments between July 1 and January 1, and that our stock on hand at our mills and in our retail yards was worth about $115,000 more than it would have been worth January 1 in the absence of this movement, making a total saving to the company of $260,381 * * *"[19].

In this statement is a begging of the question in three important particulars:

1. In the original assumption that the curtailment, which had affected supply only, was the sole cause of the subsequent rise in prices.
2. In the implication that the curtailment had been the result wholly of joint action as contrasted with otherwise individual action.
3. In the inclusion of the increase in value, based on present prices of unsold yard stock, as a part of actual savings.[20]

West Coast Lumber. An extraordinary claim in behalf of the association activities of West Coast manufacturers was expressed in 1904 in the assertion that to such activities had been directly attributable:

> "* * * upward of $10,000,000 during the past four years, over and above what they could have made in a disorganized state, even

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[18] Minneapolis Journal, Nov. 27, 1908; N. Y. L. T. J., May 15, 1908; p. 11; same, July 15, 1908, p. 13; A. L., June 22, 1907, pp. 46 ff.

[19] Southern Lumber Manufacturers' Association, annual meeting, New Orleans, January, 1905, address of president: N. O. L. T. J., Feb. 1, 1905.

[20] The fact that a certain price has been secured for the stock actually sold does not imply that the stock remaining, subject to sale in the future at whatever prices then prevail, represents a present profit computed on the basis of present prices. In fact, if the manufacturer had offered for sale his entire stock instead of a part of it, it is probable that he would have secured a lower price for all.

> under the most favorable conditions. * * * [This had been achieved at a cost of $23,000] yet we have been told at times when, on account of over-production, floods, crop failures, or other unforeseen causes, prices were weak, that the associations were of no earthly account and that their price lists were a farce."[21]

It is interesting to note that, despite the joint activities of the associations, fir prices, during one year ending with the second quarter of the same year, 1904, declined 26.4 per cent. See Diagram 13.

Again in 1906 it was claimed that association activity had been the cause of a gain to members, during 1905, of $5,264,250 at an expense of only $10,874.09.[22] By referring, however, to Diagram 13, it will be noted that during 1905 the prices of all species greatly increased, irrespective of the connection or of the lack of connection with strong organization. The prices of Lake States hemlock, for example—the hemlock association's price activities were then conspicuously ineffective—increased with equal rapidity and those of North Carolina pine increased much more rapidly than did fir prices.

Fallacious assumption respecting prices. In these extravagant statements the same fallacious assumptions are in evidence. Coming from sources of presumably competent judgment, such claims, however unsubstantiated in fact, cannot but have provoked an impression among the public, unconversant[22a] as it has been with the organization of the lumber industry, and sharing neither the optimism nor the trade aspirations of prominent association officials, that the recent rapid relative increase in lumber prices has been due to a monopoly control of lumber supply.[23] The reason why such statements have been made is, of course, plain. They have been based, however, upon an assumption the fallacy of which is unquestionable, namely, that except for the association activities lumber prices would have either remained stationary or would have fallen.

Association Price Activities Not a Substantial Influence.

In the report by the Department of Commerce[24] on the investigation of competitive conditions in the lumber industry, it has been asserted that

> "association price lists, and the so-called 'individual' price lists which were formulated at conferences of lumbermen 'acting as individuals,' *have had and do have an important effect on the* actual sale prices of lumber * * *."[25]

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[21] Organization in the Far West; in M. V. L., Jan. 22, 1904, p. 74.

[22] Official Circular dated Feb. 21, 1906; see P. C. L. T. J., Nov., 1905, p. 11.

[22a] Official Report, Tenth Annual Convention, Nat. Lum. Man. Assoc., 1912, pp. 37, 38.

[23] The Lumber Industry, Pt. IV, p. 19.

[24] Lumber Industry, Pt. IV, p. 12; also xvii. This refers to manufacturers lists. A partial qualification is later made: "The condition of increasing demand and decreasing supply has given great strength to the lumbermen's efforts to reduce competition and arbitrarily fix prices." Ibid., p. 20.

[25] Italics not in original text.

In their bearing upon this statement which refers to the period covered by the investigation, i. e., 1896 to 1910, the following facts are significant, which have been shown in this study:

First, natural influences, beyond the control of association activity, have been the cause of even greater relative increases in prices in the past; also of increases, since 1896, in Canada, which have been as great as those in the United States during the same period. Natural influences are, therefore, by presumption and by analogy an adequate explanation of the relative increase in lumber prices as compared to general prices in the United States since 1896.

Second, as has been shown in Diagram 1, the relative increase of lumber prices as compared to general prices, began in 1880, 1881 and not in 1896, 1897, as has been assumed by the Department of Commerce.

Third, the rate of such relative net increase during the period 1880 to 1896 was greater than during the period 1897 to 1910. During the former period, however, there were few associations.[26] Price list activities and efforts at organized curtailment of production were then practically unknown.[27]

Fourth, the differences between the price movements, since 1896, of different species are capable of explanation without resort to the assumption of the artificial influence of joint action.[28]

Fifth, association price activities have not prevented rapid and extensive decline in prices, especially in 1900, 1903-4 and 1907-8. See Diagram 13.

Sixth, the sharpest decline in many cases has been in the prices of those species, which have been supported by the strongest organizations, i. e., the members of which have controlled the largest percentage of the output of the species.[29]

Seventh, list prices have been almost invariably, and often greatly, higher than the prices at which actual sales have been made. List prices have prevented actual prices neither from falling lower nor from rising higher.[30]

Eighth, no concrete instances have been cited of the successful maintenance of attempted arbitrary price increases where such increases have been obviously not justified by natural competitive conditions and dependent therefore, wholly upon the arbitrary control of the supply.

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[26] See supra, p. 52.

[27] Before the organization of associations there had been occasional price agreements to which a small number of mills were party. These were short-lived, very limited in influence and almost uniformly unsuccessful in the attempted maintenance of prices agreed upon. Among certain fir manufacturers such an ephemeral agreement existed as early as 1891. M. V. L., Apr. 24, 1891, p. 9.

[28] See supra, pp. 120 to 122.

[29] See supra, pp. 52 to 55.

[30] See supra, Diagram 3, p. 19.

Ninth, there have been many instances of complete failure of such attempts.[31]

Tenth, a large proportion of the lumber output has been the product of both large and small mills outside of the associations, and also of many association mills which have sold lumber at prices lower than "list," either voluntarily or because of financial pressure.[32] The proportion of the output manufactured by these mills has been sufficient to compel other association mills to meet the lower prices,[33] in order that they might fairly share in the business. The more has this been true since, in general, such mills have had a surplus capacity, which would have enabled them to greatly increase their output in case the association mills had refused to meet their prices.

Eleventh, the investigation has covered only a period of generally rising prices. No comparison has been possible therefore with price phenomena of a period of declining actual prices.[34]

In the interpretation of association activities a distinction is observed between those which have been purely educative and those formally attempting the maintenance of certain agreed prices. Individual activities also are to be distinguished from those activities which are practicable only by co-operative action.

Arbitrary Increases Unsuccessful: Poplar. Theoretically the maintenance of an arbitrary price increase depends upon the degree of control of supply and the availability of substitutes.

If the general level of lumber prices has been raised by artificial joint action, such effect has been the result of an adequate degree of control over the supply, not of a particular species only, but of other species also with which it has competed in common markets. In 1902 the Yellow Poplar Manufacturers' Association was organized at Lexington, Kentucky; later in the year it was absorbed by the Hardwood Manufacturers' Association of the United States.[35] For certain uses many other species competed with poplar; for others few. At its organization the association of poplar manufacturers claimed that its membership controlled 90 per cent of the poplar output of the United States. On September 15, 1903, the Hardwood Manufacturers' Association arbitrarily raised poplar list prices from 2 to 9 dollars per thousand feet on items of which the previous normal prices had ranged from 22 to 45 dollars, f. o. b., Ohio River. The prices of actual sales however, not only did not respond to the attempted increase, but immediately declined. The decline continued until the beginning of 1905. Meanwhile the nominal list prices, ranging from 5 to 14.50 dollars above actual prices, were maintained until January 27, 1905, when the association lowered the list more than they had previously raised it. Not again until 1908, was it increased to the level attempted in 1903.

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[31] N. O. L. T. J., Feb. 15, 1899, p. 16; Minutes of Annual Meeting, 1907, of Northwestern Hemlock Manufacturers' Association: M. V. L., Oct. 2, 1908, p. 38.

[32] See supra, pp. 84 to 87.

[33] E.g., M. V. L., Aug. 30, 1907, p. 22: "It is a well-known fact that the yellow-pine market has been decidedly unstable even at times when the demand for lumber has been the greatest. * * * As is the case with southern pine, its production [hemlock] is very largely in the hands of those who are either financially unable to hold their lumber for its true value, or who seem incapable of appreciating what it is worth. *The small manufacturer sets the pace* which must be followed to a certain extent."

[34] The Lumber Industry (Pt. IV, p. xviii); Pt. I, p. xvii.

[35] N. Y. L. T. J., Feb. 15, 1903, p. 14.

The current trade comment on this adventure is significant:

> The recent advance of $9.00 a thousand in prices of clear poplar by the manufacturers of the Ohio River district, does not appear to have been followed here.—Chicago, A. L., Sept. 26, 1903, p. 57.
>
> There are only three contingencies that can reduce the consumptive demand for poplar—a constricted money market, excessive or prohibitive prices and substitution. We have assurance from a high official source that our national finances are in a fairly healthy condition. The price list adopted by the association is not prohibitive and the substitution of other woods for poplar has already been carried to about the limit.—S. L., Oct. 1, 1903, p. 9.
>
> The high prices have not materialized as yet and orders are being freely taken at the old list.—Boston, A. L., Oct. 17, 1903, p. 60.
>
> The advanced prices * * * are not obtaining in all current sales.—New York, S. L., Nov. 1, 1903, p. 28.
>
> Producer and buyer agree that the Buffalo market will not pay the advance.—Buffalo, S. L., Nov. 28, 1903, p. 61.
>
> The one really off-color wood is poplar, and all because the effort to jump up the price $8 or $10 has been repudiated by the trade pretty generally.—Buffalo, N. Y. L. T. J., Jan. 1, 1904, p. 32.
>
> It is a fact that Buffalo at least is using much less poplar than it used to.—Buffalo, A. L., Nov. 19, 1904, p. 55.
>
> Poplar which has steadily refused to make any rises after the hard setback which it received a few years ago when the $8.00 change was announced shows a tendency to stiffen in price.—Pittsburgh, N. Y. L. T. J., Nov. 15, 1905, p. 24b.

Strategically no better situation for the maintenance of an arbitrary advance in lumber prices could have been conceived than that which had faced the poplar manufacturers. There had been a shortage, both of logs and of lumber.[36] The manufacturers curtailed production; they exported large quantities[37] at lower prices. They used practically all known devices to maintain the "list." Nevertheless, substitution increased; the prices fell. The attempt was a complete failure.

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[36] S. L., Dec. 15, 1903, p. 8.

[37] A. L., Apr. 30, 1904, p. 55.

The Michigan Maple Co. Although maple lumber has come from practically every lumber-producing state, more than one-half of the current output since 1901 has been manufactured in Michigan. In that year was organized the Michigan Maple Co., a selling agency estimated to control 85 per cent of the State's product.[38] The following comment shows the movements of the price of a single special high grade item, maple flooring, in the hands of a strong organization:

> Those familiar with the hardwood business know that for a long time maple lumber has been in a depressed condition, seldom commanding the prices warranted by those obtaining for other and competitive woods.—Grand Rapids, A. L., Oct. 26, 1901, p. 28.
>
> There has been a hardwood association in Michigan, but it did not solve the maple problem.—A. L., Feb. 8, 1902, p. 11.
>
> There are still reports of maple selling low in spite of the combine to put it up.—Buffalo, A. L., May 17, 1902, p. 47.
>
> Maple flooring is reported off in price, with rumors of cutting constantly confirmed.—Boston, A. L., July 12, 1902, p. 51.
>
> The situation in maple flooring is far from satisfactory. It is claimed that there are few sales at the list and that mills outside the association are securing all the orders.—Boston, ibid., Jan. 10, 1903, p. 51.
>
> Maple flooring has gone to pieces and it is impossible to quote current prices as they vary so much.—Boston, ibid., Feb. 21, 1903, p. 57.
>
> Maple flooring is selling in excellent volume with several of the manufacturers and prices are being shaded from $1 to $3.—Chicago, ibid., Aug. 1, 1903, p. 53.
>
> Maple flooring manufacturers still complain of light prices and jobbers agree that they can buy flooring in some instances at about $5 off the list price.—Buffalo, ibid., Apr. 16, 1904, p. 65.
>
> All the advances made in price recently are holding well, except that in maple flooring, which seems not to have been warranted. —Philadelphia, ibid., Sept. 30, 1905, p. 53.

It is unlikely that any association has been in a position more strategic for the maintenance of an arbitrary advance in prices than have been the manufacturers of poplar or of maple flooring.

List Prices and Actual Prices Compared.

Southern Yellow Pine. The vehicle of association price activities has been the *price list*, under whatever nominal title.[39] List prices have been almost invariably higher than actual prices. During periods of rising prices the latter have occasionally overtaken the "list" before a further advance has been agreed upon. See Diagram 3. The same phenomena have characterized the prices of all species for which lists have been issued. The average difference between "list" and actual prices has varied with association policy and with differences, as between species, in the conditions of production and of distribution. In Diagram 22, the list prices of three typical items of yellow pine common lumber are contrasted with actual prices. The base lines represent the respective actual sales prices, the curves the disparity between such prices and "list" in dollars per 1,000 feet. Only where both prices for the same month have been available has the comparison been recorded.[40] The curve does not therefore illustrate historical price movements by years. It shows by direct comparison of "list" with actual prices that the former have been almost uniformly higher.[41] Exceptions to this rule have occurred during periods of rising prices of lumber of all species irrespective of the presence or the absence of strong association price activities.

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[38] A. L., Nov. 3, 1906, p. 40.

[39] "Official price list," "standard price list," "prevailing prices," "market report," "ascertained prices," "basis list," etc.

The maximum disparity here shown between actual prices and list prices is 27.1 per cent of the former.

Northern Pine and Douglas Fir. Because nearly one-half of the annual production of softwood lumber consists of yellow pine, the failure of southern manufacturers to maintain list prices, is especially significant. Southern pine has competed with all other softwood species in a wide range of common markets. If the level of yellow pine prices has not been artificially raised by joint activity through the associations, the presumption is that the prices of the species with which yellow pine has competed have not been substantially increased by arbitrary influences.

Of the important softwood species reviewed in this study, Douglas fir has been relatively the most plentiful; white or northern pine the most exhausted. The limited supply of white pine lumber compared with the demand for it has rendered the position of the manufacturer of white pine the most strategic in the soft wood industry as respects the conditions of maintenance of agreed prices.[42] Although, therefore, the disparity between list prices and actual prices has been less than in the case of other species, the range of difference has nevertheless

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[40] Thus in 1896 for only one month were both list and actual sales prices found for A; in 1899 for nine months. The broken line indicates that the two quotations have not been available.

[41] A., 1908, list price, \$15.25; actual price, \$12.

Legend:
A—No. 2 Common dimension; list prices 2"x4"x16'; invoiced mill deliveries, 2"x4"14'-16'; range of actual prices 1897, 1907, 1910, \$8, \$20, \$16, respectively.
B—No. 1 Common, 1"x4"; range of prices, \$11, \$25, \$19.
C—No. 2 Common boards; list prices, 1"x12"x16'; invoiced mill deliveries, 1"x12"x12'x16'; range of prices, \$10, \$21, \$17.

[42] The price lists issued by or for the northern pine manufacturers have usually been based on a careful canvass of market conditions, available stock and demand. Aside, therefore, from possible compulsory administrative features these lists have been in effect indistinguishable from other educative activities of the association. See A. L., Sept. 3, 1904, p. 26; same, May 13, 1905, p. 70; same, Sept. 23, 1905, p. 25.

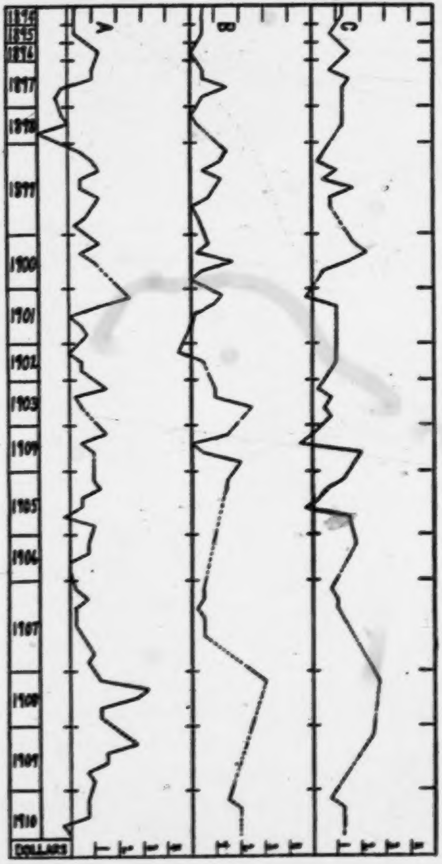

DIAGRAM 22.
Comparison of List Prices and Actual Sale Prices of Southern Yellow Pine Lumber.

been large.[48] In Diagram 23 are compared the list and actual prices of five items of northern pine common lumber f. o. b., Minneapolis and of Douglas fir logs, of the three recognized grades, on Puget Sound.

The actual prices of northern pine dimension, 6"x6"x12-16' (not shown graphically), did not rise above "list" during the entire period 1902 to 1910; maximum disparity, 17.3 per cent in 1908; 14.3 per cent in 1901. A similar comparison in the case of 2"x12"x16' dimension shows a disparity of 13.3 per cent in 1908; in the case of 2"x4"x12-16' dimension one of 17.6 per cent. Only once during the period did the actual price of either item exceed the list price. In neither case did this difference exceed 1.5 per cent of the actual price then prevailing.

It is evident that whatever may have been the purpose of the list prices issued by or for the associations the prices at which sales of lumber of all species have been actually made have been, with almost unbroken uniformity, much lower than "list." The determination of the effect upon lumber prices of organized activities is not concerned with the proof that price agreements have been made. That such agreements have existed is not in dispute. Nor is it concerned with the degree of adherence to such price lists by the lumber manufacturers. The issue is: Have the manufacturers, who have declined to sell at less than "list," made the sales which have determined the price of lumber? The data submitted covering important species are conclusive evidence that the average "market price" has been substantially less than "list." As has been indicated in the introductory chapter[49] a "range" of prices has existed, both above and below the "modal" price, i. e., the price at which the bulk of the sales has been made. Sales at "list" and occasionally at much more than list have been recorded. These have been, however, the abnormalities and anomalies of the subject matter of lumber prices with which this study is not concerned.

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[48] Furthermore, the association price policy has been conservative. No radical increases have been attempted. Indeed, the greatest relative increase observed in list prices of northern pine boards during the period 1901 to 1910 has been 5 per cent of the immediately preceding prices; of northern pine dimension, 8 per cent. Both of these occurred during a period of rapidly rising *general* lumber prices.

Legend:
1—No. 1 Common dressed northern pine, 1"x12"x16';
2—No. 2 Common dressed northern pine, 1"x12"x16';
3—No. 3 Common dressed northern pine, 1"x12"x16';
4—No. 4 Common dimension, 1"x4—"x16—20';
5—No. 5. Common dimension, 1"x4—"x16—20';
6—Fir logs, flooring;
7—Fir logs, merchantable;
8—Fir logs, No. 2.

Comparison:
1—Maximum disparity during the period, between actual and list prices, in per cent of actual prices, 9.3, in 1904; range of actual prices, 1902, 1907, 1910, $23, $33, $35.75, respectively.
2—12.3 in 1904; range, $18.75, $27, $30.
3— 8.9 in 1906; range, $16.50, $23.50, $22.50.
4—10. in 1908; range, $10.50, $18.25, $14.25.
5—13. in 1906; range, 1904, $8.25; 1907, $13; 1910, $7.50.
6—20. in 1904; 17.6 in 1903; range of actual prices, 1901, 1907, 1909, $6.75, $15, $11.
7—23.1 in 1903; 25. in 1908; range, 1901, $5.50; 1907, $12; 1909, $8.
8—29.4 in 1903; range, $4; $9, $5.50 (same years).

[49] See supra, pp. 19, 20.

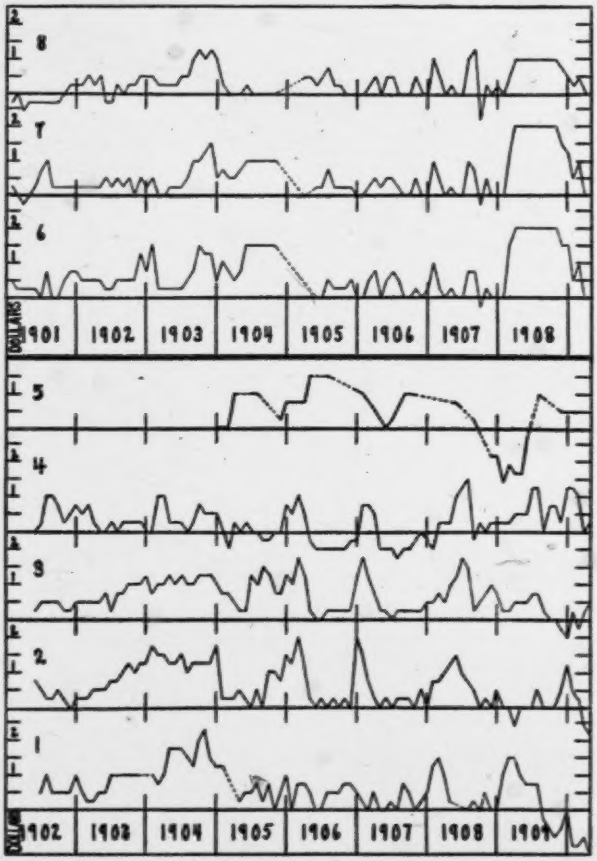

DIAGRAM 23.

Comparison of List Prices and Actual Sale Prices of Northern Pine and of Douglas Fir.

Note: Base lines represent the actual sales prices. The broken lines represent the departure of list prices from the prices of actual sales.

THE BOSTON AGREEMENT.

The National Wholesale Lumber Dealers' Association and the Eastern States Retail Lumber Dealers' Association in 1899 formed the so-called "Boston Agreement." This agreement provided for the classification of the trade into:

> "1. Manufacturers; 2. wholesale dealers or agents; 3. retail dealers and other legitimate customers of the wholesale trade."[45] The chief purpose of the agreement was the remedy of the "pronounced and recognized evils from which both branches [retailer and wholesaler] are suffering, viz.:
>
> 1. Sales by manufacturers and wholesalers to consumers.
> 2. Sales by brokers, agents and commission men to consumers.
> 3. Sales and quotations by the so-called retail dealers to consumers, through agents, and by methods used by the wholesaler in soliciting trade from the retailers."[45]

Because of disagreement over the classification of the trade the western wholesalers and the retailers' association in 1903 withdrew from the "Boston Agreement," the latter officially for "legal reasons."[46] The "Boston Agreement," modified by the subsequent "Baltimore" and "Pittsburgh Amendments" (providing for certain extensions in the classifications), was thereafter adhered to only by the New York State[47] retail organizations and by the Lumbermen's Club of Boston.[48] Because of the classifications of "legitimate" trade and of the devices used in their enforcement, suit was later brought by the United States against the Eastern States Retail Lumber Dealers' Association. Unfair practices and numerous restraints upon trade were uncovered. These, however, have concerned chiefly the retail distribution of lumber.

THE MISSOURI OUSTER SUIT.

In 1907 Attorney-General Hadley of Missouri instituted an inquiry into the legality of the "price list" or "market report" and of organized curtailment of production. Suit was subsequently brought in ouster proceedings against twenty-nine companies operating in Missouri for alleged violations of the state anti-trust law. In December, 1913, the Missouri Supreme Court issued a decree ousting twenty domestic companies and revoking the license of five others to do business within the State. The charges sustained by the court were:

1. Illegal use of association price list;
2. Curtailment in 1904 and 1908 to raise prices;
3. Entering an agreement in 1904, called the "Joint Trade Relations Agreement," between members of the Yellow Pine Manufacturers' Association and members of various retail organiza-

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[45] N. Y. L. T. J., Nov. 1, 1906, p. 60.
[46] A. L., Mar. 14, 1903, p. 13.
[47] St. L. L., Mar. 15, 1903, p. 44.
[48] A. L., Apr. 11, 1903, p. 16.

tions. By this the manufacturers and wholesalers agreed to sell only to certain "legitimate" retailers, the retailers agreeing thereby to buy only from members of the Yellow Pine Manufacturers' Association;

4. Blacklisting certain retailers, so-called "poachers"; dividing territory; refusing to sell to consumers and co-operative stores in carload lots.

Fines aggregating $436,000 were imposed. Execution was staid however, in many cases, on condition of future compliance with the law. As a result of the Missouri Ouster decision the Yellow Pine Manufacturers' Association has been reorganized under the name of the Southern Pine Association:[49]

> "It is not proposed to in any manner agree upon prices, nor in any manner agree upon curtailment of production, but * * * to give information both as to prices and production."
>
> The plan "is one of business up-lift; * * * it is one of a campaign of trade extension, giving close and careful study and analysis to the usages of lumber and the purposes for which it is adapted, to grading and inspection * * *."[50]

In so far as it involves the influence affecting the wholesale prices of lumber, this decision is inconclusive. The evidence and the decree indicate not that prices were actually raised by arbitrary action, but that the purposes of such action were illegal. That associations have frequently aspired to price fixation is beyond question.[51] The substantial achievement of this purpose, however, has been impracticable. Not only has the law intervened as a deterrent, but the fundamental organization of the lumber industry has prevented the accumulation of that degree of control over supply without which joint action with intent to raise prices could not have been effective.

STATIC INFLUENCE OF JOINT ACTION.

Concerted price activities have exerted a static rather than a dynamic influence upon actual lumber prices. The bulky nature of lumber and the dependence of its market upon the uncertainties of railroad transportation, have tended to make an abnormal scarcity of supply in certain markets only slowly self-corrective. Under certain conditions of the market, therefore, for example where supply has been short and substitutes temporarily unavailable, organized action by a group of manufactures may have effectively maintained increased prices until normal conditions of supply have again prevailed.[52] Because of the tardiness with which normal competitive conditions have been often resumed in the lumber industry, such temporary increases may have been sufficient in the aggregate to have adequately remunerated the manufacturers for the administration of this department of their joint activities.

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[49] Business and Lumber Trade Conditions, No. 35, Dec. 24, 1914, p. 2.

[50] Ibid., p. 3.

[51] Practically the entire report on this subject by the Department of Commerce has been devoted to evidence that the manufacturers' associations have wished to, and have tried to, fix prices and to establish such prices upon the market.

[52] Joint curtailment of supply, during periods of low prices for lumber, over and above the curtailment that would have been accomplished as the *natural* result of *individual* action under such conditions, has probably occasioned a *temporarily* higher price, i. e., until normal competition has reasserted itself. For

That a certain degree of control over the supply of lumber would have involved a control over prices—subject to the potential substitution of other materials for lumber—has not been in question. Because of the fundamental organization of the lumber manufacturing industry, as reviewed above, and because of the surplus capacity of the sawmills in much of the lumber manufacturing territory of the United States, the *degree* of such control of supply would however, have been necessarily high in order to have insured the control of prices.

To such a degree of control it is probable that many lumber manufacturers have aspired, as have manufacturers in other industries. To the earnest promotion of this end are doubtless to be ascribed the occasional extravagant, misleading and obviously unwarranted claims for co-operative price activities, as measured by the past prices of lumber. Such concentration of control has not however, been even in a measure achieved. Greater uniformity of lumber prices and less wide temporary fluctuations have indeed resulted from association activities. The effect, however, upon the general level and upon the historical movements of wholesale lumber prices, of association activity in promotion of higher prices, has not been important. The attribution to efforts at organized restraint, of a substantial influence upon lumber prices in the United States, finds warrant neither in the conditions of the industrial organization of lumber manufacture nor in the statistical evidence descriptive of its recent history.

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example: "It is perfectly apparent that the policy of curtailment which went into effect on July 1 has been of great benefit to the market." A. L., Aug. 6, 1904, p. 15. This, however, implies no substantial change in the long-time level of lumber prices.

APPENDIX

I. SOURCES OF ITEMS CONSTITUTING THE GENERAL INDEX OF LUMBER PRICES.

Numbers on left margin indicate weights allotted to each species. Numbers in parenthesis are the total of weights of all species for the period. Indented numbers show the weights given to different items, in the same or in different markets, within the individual species under which they appear.

I. 1860 to 1865.

- (10) 5 White pine:
  - 3 Chicago; Merchants' Magazine, Vol. 54, 1866, pp. 106, 107.
    - 1 clear; 1 common; 1 cargoes.
  - 2 Albany; ibid., Vol. 52, 1865, p. 397; Vol. 49, 1863, pp. 373, 374.
    - 1 clear; 1 select box; 1 box.
- 2 Spruce, 1″ rough boards; Senate Finance Report (Aldrich) 1893.
- 2 Oak, white, 1″ plain, rough, firsts; ibid.
- 1 Hemlock, 1″ rough boards, firsts; ibid.

II. 1865 to 1870.

- (20) 10 White pine (boards):
  - New York; Commercial and Financial Chronicle, monthly.
    - 1 clear; 1 merchantable box; 1 box.
- 3 Spruce, eastern; New York; ibid.
- 1 Hemlock, boards and planks; New York (begins 1868); ibid.
- 3 Southern pine, boards; ibid.
- 3 Oak, white 1″ plain, rough, firsts; Sen. Fin. Rep., 1893.

III. 1870 to 1879.

- (21) 10 White pine:
  - 1 New York; Com. and Fin. Chron.
    - 1 clear; 1 merchantable; 1 box.
  - 1 Bay City; Annual Review of the Manufacture of Lumber and Salt in the Saginaw District.
    - 1 uppers; 1 common; 1 shipping culls.
- 3 Spruce, eastern; Com. and Fin. Chron.
- 2 Hemlock, boards and planks; ibid.
- 3 Southern pine, boards; ibid.
- 3 Oak, white, 1″ plain, rough, firsts; Sen. Fin. Rep., 1893.

IV. 1875 to 1887.

- (19) 10 White pine; Sen. Fin. Rep., 1893; Buffalo:
  - 3 clear, extra, 1″ rough boards;
  - 4 clear, common, 1″ rough boards;
  - 3 culls, 1″ rough boards.
- 3 Spruce, 1″ rough boards, New York; ibid.
- 2 Hemlock, Pennsylvania stock, firsts, 1″ rough; ibid.

3 Oak, white, plain sawed, firsts, 1" rough boards; ibid.
1 Yellow pine, rough; mill run, f. o. b. mill (begins 1883).

V. 1887 to 1896.

(23) 9 White pine:
3 Buffalo—Tonawanda; N. Y. L. T. J., monthly.
1 uppers, rough, 1"x8" and up x ';
1 uppers, rough, 4"x8" and up x ';
1 selects, rough, 1"x8" and up x ';
1 selects, rough, 4"x8" and up x ';
1 No. 1 barn, rough;
1 No. 1 culls, rough.
1 No. 2 barn, rough, "x10"x '; (1890 to 1896) Buffalo; ibid.
2 Mill run, f.o.b. mills in Mich., Wisc., Minn. 53 Cong., 2 Sess., Sen. Com. on Fin., 1894, Bull. Nos. 27-30; 53 Cong., 2 Sess., S. Rep., Vol. 11, Nos. 444-446; 451, (1887 to 1894).

4 Yellow pine:
1 New York; N. Y. L. T. J., monthly.
Longleaf, heartface siding, 1" to 5/4"x " x '; (1890-1896).
1 Mill run, f.o.b. mills in Southern States (1887 to 1894); Sen. Com. on Fin., 1894, Bull. Nos. 27-30.

2 Hemlock, New York; N. Y. L. T. J., monthly.
1 merchantable dimension, (1890-1896);
1 firsts, 1" rough boards, (1887-1890);
1 merchantable boards, 1"x "x '; (1887-1889).

2 Douglas fir:
1 Portland, Ore., f. o. b. (1894-1896); Dept. of Commerce.
1 clear v. g. No. 2 flooring, 1"x4" or 6"x10—16';
1 common boards and shiplap, 1"x12"x12—16'.
1 Mill run, f.o.b. mills in Wash., Ore., (1887 to 1894); Sen. Com. on Fin., 1894, Bull. Nos. 27-30.
2 Spruce, eastern; N. Y. L. T. J., monthly.
1 New York, (1890 to 1896); merchantable dimension;
1 Mill run, f.o.b. mills in Maine (1887 to 1894); Sen. Com. on Fin., 1894, Bull. Nos. 27-30.

3 Oak:
2 New York; white; N. Y. L. T. J., monthly.
1 firsts and seconds, quartered.
1 Mill run, f.o.b. mills in Central States (1887 to 1894); Sen. Com. on Fin., 1894, Bull. Nos. 27-30.
1 Redwood: quoted annually (April) by Redwood Association, San Francisco.

VI. 1896 to 1910; Dept. of Commerce; Bur. of Corp.

(24) 7 Southern yellow pine, f.o.b mills, Mo.; (1896 to May, 1907); Tex. (June, 1907 to 1910).
1 No. 1 common boards, dressed, 1"x12"x12—16';
1 No. 1 dimension, dressed, 2"x4"x14—16'.

2 North Carolina pine, f.o.b. Norfolk.
  1 box or No. 4 stock, rough, 1″x12″x ′;
  1 No. 3 flat grain flooring.
4 Douglas fir (and western pine) f. o. b. Puget Sound.[1]
  1 No. 2 v.g. flooring, clear, ″x ″x10—16′;
  1 No. 2 drop siding, clear, 1″x6″x10—16′;
  2 common dimension, 2″x4″x8—16′.
4 White (northern) pine, f.o.b. Minneapolis.
  1 No. 2 common boards, dressed, 1″x12″x16′;
  1 No. 3 common boards, dressed, 1″x12″x16′;
  1 No. 1 dimension, rough, 6″x6″x12—16′;
  1 C-selects, dressed, 1″x12″x16′.
2 Hemlock, Lake States, f.o.b. Wausau.
  1 dimension, dressed, 2″x12″x16′;
  1 dimension, dressed, 2″x4″x16′.
1 Spruce.
  1 West Virginia; "all markets"; dimension, 2″x4″x12—14′;
  1 eastern; Boston; frames, rough dimension, 2″x10—12″x ′.
1 Cypress (1899 to 1910), f.o.b. New Orleans.
  1 selects, rough, 1″x4″x10—20′;
  1 firsts and seconds, rough, 2″x ″x10—20′.
3 Oak, white and red, delivered in Chicago.
  1 firsts and seconds, plain sawed, 1″ rough.

VII. 1910 to October, 1912; Forest Service, Record (monthly) of Wholesale Prices.

(25) 7 Southern yellow pine, f.o.b. mills.
  2 Louisiana:
    1 No. 1 dimension, S1S1E, 2″x8″—16′;
    1 No. 1 common boards, S2S, 1″x10″x ′;
    1 No. 2 common boards, S2S, 1″x8″x ′.
  1 Mississippi: same items;
  1 Texas: same items.
3 North Carolina pine, f.o.b. mills.
  1 North Carolina:
    1 No. 2 flooring, 1″x4″x10—16′;
    1 No. 3 flooring, 1″x4″x10—16′.
  1 Virginia:
    1 box edge, 4/4, under 12″ in width.
4 Douglas fir, f.o.b. mills.
  1 Washington:
    1 No. 2 v.g. flooring, 1″x4″;
    1 No. 2 slash, drop siding;
    1 common dimension, S1S1E, 2″x12″x—16′.
  1 Oregon: same items.

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[1] Because of a substantial similarity between the prices of western pine and of fir, and in the absence of a satisfactory series for the latter, the weight given to fir is greater than its average importance in lumber production during the period would justify. In 1912 western pine contributed 3.1 per cent and fir 13.2 per cent of the total product of lumber.

1 Western pine, f.o.b. mills.
1 Idaho:
1 No. 2 common boards, 1"x8"—16';
1 No. 1 common dimension, 2"x8"x —16'.
1 Washington: same items.
2 White (northern) pine, f.o.b. mills.
2 Minnesota:
1 No. 3 shop, 1¼"x "x ';
1 No. 3 boards, "x12"x10—20';
1 No. 4 boards, "x "x10—20';
1 Mill run.
1 Wisconsin: same items.
2 Hemlock, f.o.b. mills, Lake States.
1 Michigan:
1 piece stuff, S1S1E, 2"x4"—16';
1 No. 1 boards, S1S, 1"x8"—16'.
1 Wisconsin: same items.
1 Spruce, f.o.b. mills.
1 West Virginia:
1 frames, merchantable, 3"x4" to 8"x8"x10—16';
1 boards, merchantable, 1"x12"x10—20'.
1 Maine, eastern:
1 frames, merchantable, 9"and under; 24' and under.
1 Cypress, southern, f.o.b. mills, Louisiana.
1 selects, 1";
1 No.1 common, 1";
1 No. 2 common, 1".
1 Maple, f.o.b. mills.
1 Michigan (hard): No. 1 common, 1";
1 Wisconsin (soft): No. 1 common and better, 1".
3 Oak, red and white, f.o.b. mills, Indiana.
1 No. 1 common, 1";
1 No. 2 common, 1";
1 firsts and seconds, 1".

VIII. 1912, 1913, 1914. New York; N. Y. L. T. J., monthly.

(20) 8 Yellow pine.
5 longleaf, heartface siding, 1" and 1¼";
3 longleaf, B heartface, riftsawn flooring, D&M, 1"x3".
2 White (northern) pine.
1 No. 2 barn, rough, 1"x10";
1 uppers, rough or dressed, 1".
2 Hemlock (base price): Pennsylvania and West Virginia stock.
1 Spruce, eastern, cargoes, 6" to 9".
1 Maple, hard and soft, firsts and seconds, 1".
3 Oak.
2 white, rock, mountain or W. Va. stock, firsts and seconds, plain sawed, 1";
1 white, Indiana, firsts and seconds, quartered, 6" and up wide, 10—16'.

1 Poplar, yellow, firsts and seconds, rough, 7—17" wide.
2 Cedar, red. f. o. b. mills, Washington, clear.

The relative prices, derived from the above items, constitute the quarterly index of lumber prices, referred to the base price, 100, *which is the average price for the* 36 *months,* 1901 *to* 1903.

II. RELATIVE GENERAL LUMBER PRICES IN THE UNITED STATES: 1860 to 1913.

1860	40.5	1877, 1	71.6	1903, 1	107.22
1861	45.3	2	71.6	2	107.59
1862	49.8	3	71.6	3	107.19
1863	67.5	4	71.6	4	105.85
1864	87.2	1878, 1	72.	1904, 1	103.87
1865, 3	81.5	2	71.	2	101.28
4	93.5	3	71.	3	97.48
1866, 1	101.2	4	70.5	4	100.03
2	100.	1879,	67.	1905, 1	103.61
3	99.	1880,	74.6	2	109.05
4	97.2	1881,	75.	3	112.65
1867, 1	94.6	1882,	79.2	4	120.21
2	96.5	1883,	88.	1906, 1	126.08
3	90.2	1884,	80.	2	139.12
4	78.5	1885,	77.6	3	139.17
1868, 1	81.	1886,	76.9	4	140.17
2	81.7	1887,	80	1907, 1	141.3
3	79.5	1888,	79.5	2	147.4
4	83.	1889,	79.1	3	150.32
1869, 1	82.8	1890,	77.	4	140.84
2	82.8	1891,	76.3	1908, 1	124.02
3	82.2	1892,	76.8	2	116.32
4	81.5	1893,	75.2	3	112.21
1870, 1	84.	1894,	70.6	4	121.1
2	84.1	1895,	68.6	1909, 1	131.12
3	84.4	1896, 1	74.34	2	128.6
4	83.3	2	71.59	3	122.51
1871, 1	87.4	3	66.92	4	128.2
2	81.4	4	65.36	1910, 1	130.75
3	84.8	1897, 1	69.1	2	134.83
4	97.4	2	65.33	3	129.57
1872, 1	94.6	3	64.52	4	129.7
2	98.7	4	70.96	1911, 1	131.4
3	98.	1898, 1	72.46	2	131.8
4	98.	2	72.76	3	131.5
1873, 1	98.2	3	71.96	4	128.6
2	98.4	4	72.85	1912, 1	130.7
3	98.5	1899, 1	72.31	2	134.6
4	85.4	2	78.17	3	145.3
1874, 1	85.4	3	84.95	4	144.
2	83.5	4	93.54	1913, 1	143.5
3	81.2	1900, 1	96.78	2	144.9
4	79.6	2	95.47	3	139.8
1875, 1	74.8	3	88.	4	137.6
2	74.8	4	84.3	1914, 1	138.2
3	73.	1901, 1	87.83	2	137.1
4	72.1	2	91.4	3	133.5
1876, 1	69.2	3	92.15	4	131.5
2	69.2	4	92.97		
3	68.4	1902, 1	95.52		
4	68.4	2	101.8		
		3	104.16		
		4	105.11		

For sources, see Appendix I.

III. RELATIVE MONTHLY AVERAGE PRICES OF LUMBER OF IMPORTANT SPECIES: 1896 to 1910.

Key to Table 11:
I. White pine, No. 2 common, dressed, 1″x12″x16′, Minneapolis.
II. White pine, No. 3 common, dressed, 1″x12″x16′, Minneapolis.
III. White pine, No. 4 common, dressed, 1″x12″x16′, Minneapolis.
IV. White pine, No. 1 dimension, dressed, 2″x4″x12-16′, Minneapolis.
V. White pine, No. 1 dimension, dressed, 2″x12″x16′, Minneapolis.
VI. White pine, No. 1 dimension, rough, 6″x6″x12-16′, Minneapolis.
VII. North Carolina pine, No. 1 flat flooring, Norfolk.
VIII. North Carolina pine, No. 1 rough boards, 1″x12″x ′, Norfolk.
IX. North Carolina pine, box or No. 4 rough boards, 1″x12″x ′, Norfolk.
X. Douglas fir, No. 2 v. g. flooring, clear, 10-16′, f. o. b. Puget Sound.
XI. Douglas fir, No. 2 clear drop siding, 1″x6″x10-16′, f. o. b. Puget Sound.
XII. Douglas fir, common dimension, 2″x4″x8-16′, f. o. b. Puget Sound.
XIII. Eastern spruce, rough dimension frames, 2″x3″ and 2″x4″, Boston.
XIV. Cypress selects, rough, 1″x ″x10-20′, New Orleans.
XV. Lake States hemlock, dimension, dressed, 2″x12″-16′, f. o. b. Wausau.
XVI. Douglas fir, common boards, 1″x12″x12-16′, f. o. b. Puget Sound.
XVII. Douglas fir, rough timbers, 10″x10″ and 12″x12″-32′, f. o. b. Puget Sound.
XVIII. Red cedar, bevel siding, "clear", 1″x6″x12-16′, f. o. b. Puget Sound.
XIX. Red cedar, bevel siding, 1″x6″x12-16′, f. o. b. Puget Sound.
XX. North Carolina pine, No. 1 rift, 2½″ to 3″ width, Norfolk.
XXI. North Carolina pine, No. 3 flat flooring, Norfolk.
XXII. Cypress, firsts and seconds, rough, 1″x ″x10-20′, New Orleans.
XXIII. Cypress, random peck, rough, 1″, New Orleans.
XXIV. West Virginia spruce dimension, 2″x4″x12-14′, "all markets."
XXV. West Virginia spruce dimension, 9″, 10″ and 12″ widths, -20′, "all markets."

		I. 17.85	II. 15.77	III. 11.08	IV. 14.37	V. 13.36	VI. 14.37	VII. 19.64	VIII. 37.83	IX. 13.82	X. 13.94	XI. 14.89	XII. 7.06	XIII.	XIV. 25.75	XV. 13.31	XVI. 9.53	XVII. 8.25	XVIII. 19.71	XIX. 13.57	XX. 37.23	XXI. 13.07	XXII. 31.52	XXIII. 6.29	XXIV.	XXV.	XXVI.	XXVII. 11.50	XXVIII. 12.87 13.91	XXIX. 10.78 11.18	XXX. 34.63	XXXI. 36.65	XXXII. 31.88		
1896	J.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	61.9	.....	.....	.....	.....	.....	.....	.....	57.5	.....	80.5	89.6	.....	.....	J.	1896
	F.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	73.6	67.3	.....	72.9	.....	.....	.....	.....	.....	57.5	77.3	80.5	89.6	.....	.....	F.	
	M.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	73.6	67.3	62.6	74.7	.....	.....	.....	.....	.....	57.5	73.7	76.	85.1	.....	.....	M.	
	A.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	73.6	67.3	79.	72.9	.....	.....	.....	.....	.....	.....	75.5	71.5	.....	.....	.....	A.	
	M.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	72.3	66.	77.1	72.9	.....	.....	.....	.....	.....	66.4	70.1	69.3	.....	.....	.....	M.	
	J.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	72.3	67.3	77.1	72.9	.....	.....	.....	.....	.....	69.7	68.3	64.8	.....	.....	.....	A.	
	J.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	71.	66.	79.	72.9	.....	.....	.....	.....	.....	.....	66.5	67.	83.7	.....	.....	J.	
	A.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	71.	64.6	77.1	72.9	.....	.....	.....	.....	.....	57.5	.....	.....	.....	.....	.....	J.	
	S.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	69.8	60.6	75.3	72.9	.....	.....	.....	.....	.....	55.3	.....	.....	.....	.....	.....	S.	
	O.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	69.8	60.6	76.3	72.9	.....	.....	.....	.....	.....	69.7	64.7	62.5	.....	.....	.....	O.	
	N.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	69.8	60.6	.....	74.7	.....	.....	.....	.....	.....	.....	65.5	.....	86.6	.....	.....	N.	
	D.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	71.	61.9	76.3	71.1	.....	.....	.....	.....	.....	.....	68.3	62.5	.....	.....	.....	D.	
1897	J.	65.8	.....	55.4	69.3	.....	64.4	73.8	65.8	70.3	52.8	57.1	53.1	.....	.....	.....	.....	.....	67.3	60.6	79.	71.1	.....	.....	.....	.....	70.	.....	70.1	.....	.....	.....	.....	J.	1897
	F.	65.8	.....	58.7	73.6	.....	64.4	73.5	62.9	.....	58.1	.....	53.1	76.6	.....	.....	.....	.....	67.3	61.9	77.1	71.1	.....	.....	.....	.....	70.	.....	70.1	62.5	86.6	63.1	.....	F.	
	M.	67.3	.....	.....	71.8	.....	62.6	73.8	62.9	70.3	58.1	68.8	53.1	.....	.....	.....	.....	.....	66.	60.6	77.1	72.9	.....	.....	.....	.....	70.	59.7	68.3	64.8	86.6	62.8	.....	M.	
	A.	.....	.....	54.3	69.3	.....	64.4	75.1	.....	.....	58.1	62.8	53.1	78.1	.....	.....	.....	.....	66.	59.3	.....	71.1	.....	.....	.....	.....	71.3	57.5	62.9	62.5	53.	65.5	.....	A.	
	M.	65.3	.....	54.3	69.6	.....	60.9	.....	.....	.....	54.1	62.8	53.1	76.6	.....	.....	.....	.....	64.7	60.6	79.	71.1	.....	.....	.....	.....	65.7	57.5	.....	60.3	.....	65.5	.....	M.	
	J.	.....	.....	54.3	68.3	.....	59.2	73.9	.....	66.3	52.8	62.8	53.1	75.1	.....	.....	.....	72.7	66.	60.6	78.	71.1	.....	.....	.....	.....	.....	.....	.....	.....	80.9	64.1	.....	J.	
	J.	65.	.....	49.6	69.6	.....	59.2	.....	.....	64.3	52.8	62.8	53.1	73.5	.....	.....	.....	72.7	66.	60.6	76.3	71.1	.....	.....	.....	.....	64.8	.....	62.9	60.3	.....	64.8	.....	J.	
	A.	65.	.....	51.9	69.6	.....	62.6	75.1	62.9	66.3	55.4	67.2	56.7	75.1	.....	.....	.....	72.7	66.	61.9	77.1	72.9	.....	.....	.....	.....	66.1	66.4	63.3	67.	81.6	.....	.....	A.	
	S.	65.8	.....	54.3	68.3	.....	60.9	73.5	62.9	.....	52.8	68.8	60.2	76.6	.....	.....	.....	72.7	68.5	63.3	.....	71.1	.....	.....	.....	.....	72.6	64.2	71.9	80.5	.....	64.1	.....	S.	
	O.	65.3	.....	56.4	71.8	.....	66.1	73.5	62.9	66.3	51.5	66.5	56.7	73.5	.....	.....	.....	72.7	66.	63.3	.....	69.2	.....	.....	.....	.....	72.6	59.7	73.1	80.5	80.9	64.8	.....	O.	
	N.	65.3	.....	60.9	73.6	.....	65.1	76.4	62.9	66.3	53.8	63.8	56.7	72.	.....	.....	.....	72.7	66.	61.9	.....	71.1	.....	.....	.....	.....	.....	66.4	75.5	80.5	81.6	.....	.....	N.	
	D.	.....	.....	63.3	73.6	.....	62.6	73.9	64.7	66.3	51.5	68.8	56.7	73.5	.....	.....	.....	72.7	66.	64.6	.....	71.1	.....	.....	.....	.....	.....	64.3	.....	80.5	82.3	.....	.....	D.	
1898	J.	68.6	.....	63.3	71.8	.....	66.1	77.6	64.7	.....	56.8	68.8	56.7	73.5	.....	.....	70.8	75.8	65.5	.....	73.5	69.2	.....	.....	.....	.....	68.7	66.4	75.5	80.5	82.3	69.6	.....	J.	1898
	F.	67.3	.....	60.9	71.8	.....	66.1	76.4	65.6	.....	59.4	65.8	56.7	79.7	.....	.....	76.1	84.8	69.8	68.7	73.4	74.7	.....	.....	.....	.....	68.7	64.3	75.5	87.3	83.	69.6	.....	F.	
	M.	67.3	.....	63.3	71.8	.....	67.8	73.8	.....	66.3	64.7	76.6	56.7	75.1	.....	63.	76.1	84.8	73.6	71.4	75.3	69.3	.....	.....	.....	.....	67.4	64.2	75.5	.....	.....	70.3	.....	M.	
	A.	65.3	.....	.....	71.8	70.5	69.6	.....	66.5	.....	71.3	75.6	58.7	79.7	.....	.....	70.1	84.8	73.3	70.	.....	71.1	.....	.....	.....	.....	64.8	66.4	77.3	80.5	81.6	69.6	.....	A.	
	M.	65.3	.....	63.3	70.1	.....	63.6	71.3	66.5	69.2	71.3	.....	60.2	72.	.....	63.	70.8	84.8	73.6	67.3	77.1	71.1	.....	.....	.....	.....	64.8	64.3	.....	78.3	82.3	.....	.....	M.	
	J.	65.3	.....	58.4	70.1	.....	64.4	73.8	69.3	69.3	73.6	80.6	60.2	70.5	.....	67.	76.1	84.8	72.3	67.3	74.4	71.1	.....	79.4	.....	.....	68.7	64.3	73.7	78.3	82.7	70.9	.....	J.	
	J.	67.3	.....	63.2	71.8	.....	66.1	73.5	69.3	70.3	71.3	.....	60.3	68.9	.....	71.1	.....	78.8	73.3	67.3	.....	71.1	.....	67.3	75.3	68.5	68.7	64.2	70.1	76.	83.7	69.6	.....	J.	
	A.	68.6	63.4	63.3	73.6	72.1	.....	73.8	67.4	70.3	73.9	80.6	63.1	67.4	.....	69.	73.6	78.8	73.6	68.7	.....	73.9	.....	79.4	73.8	68.5	70.	66.4	71.9	73.7	83.7	.....	.....	A.	
	S.	67.3	63.4	63.3	73.6	72.1	71.3	73.5	67.4	70.3	71.3	.....	60.3	68.9	.....	67.	81.3	81.8	71.	68.7	.....	74.7	.....	79.4	76.3	68.5	70.	70.8	73.7	76.	83.	72.3	.....	S.	
	O.	67.3	65.	69.9	77.1	73.7	71.3	76.4	64.7	.....	73.9	.....	56.7	70.5	.....	75.1	81.3	84.8	73.3	66.	76.3	72.9	.....	83.4	75.3	68.5	67.4	73.	73.7	69.3	81.6	73.	.....	O.	
	N.	71.4	66.6	69.9	77.1	73.7	71.3	76.4	.....	74.1	73.9	86.6	60.3	78.5	.....	75.1	81.3	78.8	71.	66.	.....	73.9	.....	71.5	75.3	68.5	.....	72.	77.3	71.5	81.6	72.3	.....	N.	
	D.	71.4	65.	72.3	77.1	76.3	71.3	76.1	65.6	74.1	73.9	.....	.....	78.5	.....	71.1	78.7	81.8	.....	64.6	.....	74.7	.....	71.5	74.5	68.5	71.3	68.6	71.9	.....	80.9	73.7	.....	D.	
1899	J.	71.4	66.5	73.3	73.8	.....	78.3	76.1	68.5	.....	73.9	.....	.....	78.6	.....	.....	73.7	87.9	64.7	69.6	73.4	71.1	.....	79.4	75.3	73.3	73.6	75.3	70.1	73.7	82.3	73.7	.....	J.	1899
	F.	73.5	69.8	76.7	77.1	76.3	76.5	76.4	.....	74.1	73.9	77.3	60.2	79.7	55.3	.....	76.1	84.8	65.5	66.	73.4	73.9	.....	.....	75.3	72.7	75.3	77.4	73.7	73.7	86.	71.6	.....	F.	
	M.	73.8	69.2	73.3	77.1	.....	75.3	83.7	70.	70.	79.3	77.3	68.7	81.3	57.3	75.1	78.7	84.8	65.5	68.7	73.4	76.5	.....	.....	73.	76.2	76.5	77.4	75.6	73.3	85.3	72.3	.....	M.	
	A.	72.8	69.3	74.5	77.1	.....	78.5	85.3	.....	.....	79.3	80.6	56.7	82.7	63.1	77.2	73.7	87.9	67.2	68.7	73.	85.6	.....	79.4	89.8	73.	83.	75.2	79.1	80.5	86.6	73.7	.....	A.	
	M.	69.6	6.95	74.5	77.1	75.3	78.3	87.3	70.3	89.7	81.3	82.3	60.2	82.7	66.	.....	78.7	90.9	68.5	67.3	87.3	89.3	.....	83.4	.....	73.8	84.3	81.9	79.1	80.5	88.1	73.	.....	M.	
	J.	71.4	69.3	79.	78.8	78.4	78.3	85.5	.....	85.5	83.3	82.3	60.3	81.2	70.9	.....	73.6	87.9	68.5	66.	.....	103.	.....	85.3	85.7	83.3	84.3	.....	77.3	89.6	.....	73.3	.....	J.	
	J.	72.8	71.3	76.7	89.6	79.3	75.3	95.	81.7	98.6	84.5	89.	70.8	82.7	68.9	.....	76.1	87.9	73.3	67.3	90.	103.8	.....	.....	91.9	85.1	84.3	81.9	80.9	94.	90.2	74.3	.....	J.	
	A.	72.3	73.9	90.3	89.3	84.6	83.5	94.7	81.7	.....	84.5	93.3	70.8	85.7	68.9	87.3	78.7	87.9	73.3	71.4	98.7	105.7	.....	87.3	.....	87.4	85.6	90.7	88.7	.....	95.1	77.1	.....	A.	
	S.	81.2	85.6	89.3	94.6	89.3	86.7	101.3	.....	98.6	87.1	94.	81.4	.....	73.8	.....	78.7	84.8	79.9	78.1	98.4	109.3	.....	83.4	91.9	87.4	90.3	93.9	95.3	98.3	95.3	79.1	.....	S.	
	O.	81.3	85.6	101.5	94.6	90.9	90.5	108.1	.....	98.6	89.4	94.	85.5	91.9	79.6	95.5	.....	94.8	79.9	78.1	.....	114.8	.....	87.3	96.1	93.8	.....	95.1	98.9	98.5	98.2	.....	.....	O.	
	N.	82.6	85.6	103.8	94.6	89.3	88.7	109.6	95.3	97.5	89.3	94.	85.5	91.9	77.7	95.5	.....	84.8	79.9	78.1	97.3	123.9	.....	89.2	97.5	95.1	95.	97.2	98.9	105.2	100.3	90.5	.....	N.	
	D.	79.8	87.3	103.8	94.6	90.3	90.5	109.5	90.7	97.5	89.3	94.	88.1	91.9	.....	95.5	88.9	84.8	81.2	78.1	100.1	123.9	.....	107.2	96.1	101.6	94.7	96.1	96.3	111.9	98.2	90.5	.....	D.	
1900	J.	81.2	87.3	108.8	92.9	89.3	90.5	109.5	.....	106.2	95.	94.	95.6	87.2	90.6	95.5	89.9	94.8	87.5	87.5	100.1	125.7	80.4	95.2	101.	106.3	94.7	95.1	95.3	111.9	98.2	.....	.....	J.	1900
	F.	83.9	88.6	108.3	92.9	89.3	90.5	108.2	90.3	106.2	95.	94.	99.2	90.4	.....	95.5	.....	90.9	88.3	88.9	100.1	122.1	80.4	95.3	101.7	106.3	.....	95.1	95.3	107.4	.....	79.1	.....	F.	
	M.	89.6	90.4	110.6	92.9	90.9	98.2	108.2	91.6	109.2	96.4	94.	103.7	91.9	90.6	101.5	91.8	90.3	88.3	88.9	100.1	122.1	82.1	95.3	103.1	106.3	93.4	90.6	88.1	107.4	96.8	79.1	9.25	M.	
	A.	90.8	91.9	110.6	92.9	89.3	90.5	109.5	91.6	.....	100.3	94.	102.7	91.9	81.6	105.6	97.1	.....	88.3	88.9	90.3	122.1	.....	95.3	108.3	106.3	.....	101.3	86.3	96.2	95.1	79.1	.....	A.	
	M.	88.3	93.8	108.3	92.9	90.3	88.7	108.3	90.7	.....	100.3	94.	95.6	90.4	84.5	106.6	94.4	.....	88.8	86.3	.....	114.3	85.4	95.3	109.1	105.2	94.7	97.3	80.9	73.3	95.3	77.8	.....	M.	
	J.	95.4	88.8	108.3	91.1	88.3	88.7	108.3	.....	.....	99.	94.	95.6	85.8	83.5	90.5	97.1	90.9	87.5	87.5	81.8	109.3	.....	.....	.....	98.1	88.9	95.1	75.5	76.	95.3	78.4	89.	J.	
	J.	94.	95.8	105.	89.3	95.2	87.	98.7	90.7	.....	99.	.....	90.3	84.3	83.5	.....	94.4	90.9	87.5	87.5	89.1	95.4	84.6	95.3	.....	.....	85.6	90.7	79.1	73.7	96.1	77.1	87.8	J.	
	A.	95.4	94.	106.	89.3	95.3	87.	98.7	.....	.....	95.4	80.7	93.1	79.7	85.4	87.3	91.3	90.9	85.	82.5	.....	98.4	82.1	.....	97.5	98.8	83.	84.1	.....	73.3	95.3	76.4	89.	A.	
	S.	91.3	94.	101.5	87.6	94.6	85.3	91.6	.....	97.6	91.1	87.3	78.8	81.3	.....	85.3	89.2	90.9	85.	82.1	87.3	93.9	82.1	107.2	97.5	95.1	.....	84.1	75.5	73.3	95.3	76.4	89.	S.	
	O.	83.6	82.4	101.5	87.6	84.6	88.5	91.6	.....	.....	89.3	80.6	74.4	82.7	84.5	87.3	86.6	84.8	82.4	79.4	87.2	89.3	81.3	90.2	97.5	95.7	85.6	81.9	75.5	80.5	.....	75.7	.....	O.	
	N.	82.6	84.	99.3	87.6	88.1	85.3	98.3	.....	95.5	89.3	80.6	82.7	82.7	.....	81.3	.....	84.8	82.4	78.1	84.5	85.6	84.6	95.3	97.5	95.7	88.2	70.8	.....	73.3	.....	75.7	.....	N.	
	D.	82.6	84.	99.3	86.3	88.1	85.3	98.3	90.4	95.6	88.4	80.6	68.7	88.8	85.4	77.3	83.9	84.8	82.4	80.8	82.6	85.6	86.3	103.2	97.5	96.9	88.3	68.6	79.1	82.8	95.3	76.4	.....	D.	

		I. 17.85	II. 15.77
1901	J.	84.	87.2
	F.	88.3	88.8
	M.	88.3	88.5
	A.	89.6	95.1
	M.	89.6	90.4
	J.	89.6	90.4
	J.	89.6	91.9
	A.	89.6	93.5
	S.	89.6	93.5
	O.	91.	91.9
	N.	91.	93.5
	D.	92.4	96.7
1902	J.	88.	103.
	F.	103.6	103.
	M.	103.6	104.6
	A.	105.	103.
	M.	105.	106.2
	J.	106.4	104.6
	J.	107.8	104.6
	A.	107.8	104.6
	S.	106.4	104.6
	O.	107.8	106.2
	N.	109.2	106.2
	D.	107.8	104.6
1903	J.	107.8	104.6
	F.	107.8	104.6
	M.	106.4	104.6
	A.	106.4	104.6
	M.	106.4	103.
	J.	105.	106.3
	J.	105.	103.
	A.	103.6	103.
	S.	103.2	101.5
	O.	103.6	101.5
	N.	102.2	101.5
	D.	102.2	99.9
1904	J.	99.4	103.
	F.	100.8	101.5
	M.	100.8	101.5
	A.	102.2	99.9
	M.	102.2	101.5
	J.	100.8	99.9
	J.	103.6	101.5
	A.	102.2	101.5
	S.	102.2	99.9
	O.	102.2	99.9
	N.	103.2	99.9
	D.	105.	101.5
1905	J.	109.2	103.
	F.	112.4	103.
	M.	112.4	104.6
	A.	112.	106.2
	M.	112.4	106.2
	J.	114.8	106.3
	J.	114.8	107.8
	A.	117.6	111.
	S.	117.6	112.6
	O.	120.4	118.9
	N.	121.8	118.9
	D.	123.3	123.1

III. TABLE 11. RELATIVE MONTHLY AVERAGE PRICES OF LUMBER OF IMPORTANT SPECIES: 1896 TO 1910

Year	Month	I. 17.85	II. 15.77	III. 11.08	IV. 14.27	V. 15.86	VI. 14.37	VII. 19.64	VIII. 27.83	IX. 13.82	X. 18.94	XI. 14.89	XII. 7.06	XIII.	XIV. 25.75	XV. 12.31	XVI. 9.53	XVII. 8.85	XVIII. [illegible].71	XIX. 18.57	XX. 27.23	XXI. 13.07	XXII. 31.52	XXIII. 6.29	XXIV.	XXV.	XXVI.	XXVII. 11.50	XXVIII. 12.37 13.91	XXIX. 10.78 11.18	XXX. 24.63	XXXI. 36.05	XXXII. 21.92
1901	J.	94.	87.2	89.3	87.6	83.1	87.	89.9	86.2	91.6	87.1	80.6	63.7	87.8	96.1	73.1	86.6	94.8	85.7	82.1	84.5	85.6	.....	95.3	97.5	96.2	88.3	75.2	89.9	90.5	94.6	76.4	86.7
	F.	88.3	88.8	89.3	87.6	84.6	87.	94.3	85.	93.6	81.4	80.6	70.3	84.3	97.1	.....	81.8	94.8	88.7	84.8	85.3	91.1	87.1	111.1	97.6	96.9	88.2	79.6	89.9	94.	98.9	81.2	87.8
	M.	89.3	88.5	90.3	87.6	86.2	87.	91.6	88.9	91.6	88.4	80.6	74.4	88.8	97.1	77.3	89.3	94.8	96.3	90.2	88.1	89.3	88.7	.....	97.5	96.3	90.8	79.6	91.7	94.	94.6	83.9	90.1
	A.	89.6	95.1	101.5	87.6	87.8	85.3	92.9	89.8	.....	87.1	80.6	85.	95.	90.	83.3	83.2	94.8	96.8	95.2	89.1	89.3	91.2	111.1	97.5	95.7	94.7	96.3	95.3	96.2	.....	82.9	89.
	M.	89.6	90.4	101.5	89.3	87.8	87.	90.4	89.8	89.7	91.1	82.3	85.	93.4	90.	85.3	81.8	.....	97.5	86.3	89.1	89.3	90.4	.....	97.5	96.8	94.7	84.1	98.9	96.2	95.3	82.5	89.
	J.	89.6	90.4	90.3	89.3	87.8	88.7	85.5	89.8	.....	89.3	82.9	88.5	95.	90.	85.3	84.4	90.9	97.5	87.5	.....	91.1	.....	87.3	97.5	95.1	94.7	86.3	98.9	96.3	95.3	85.3	89.
	J.	89.6	91.9	97.	91.1	87.8	89.7	91.6	89.8	85.8	85.4	82.9	85.5	95.	105.8	85.3	.....	87.9	96.8	96.3	90.	89.3	90.4	87.2	97.5	96.9	93.4	96.3	98.9	.....	98.9	85.8	90.1
	A.	89.6	98.5	97.	94.6	89.3	90.5	96.3	.....	85.8	89.8	80.6	88.5	95.5	105.8	87.3	.....	94.8	98.8	96.3	90.	91.1	92.	87.3	97.5	97.3	.....	98.5	100.7	98.5	94.6	88.	87.8
	S.	89.6	98.5	97.	94.6	90.9	93.3	96.7	.....	87.7	89.8	80.6	85.	.....	.....	87.3	.....	87.9	85.	94.8	92.7	91.1	91.2	93.4	97.5	94.5	101.1	94.1	100.7	98.5	95.3	89.4	90.1
	O.	91.	91.9	90.3	94.6	89.3	93.3	91.6	.....	89.7	89.8	78.9	85.	101.1	.....	81.2	97.1	90.9	87.5	96.2	91.8	92.9	91.2	83.4	96.1	96.1	99.8	98.5	.....	98.5	93.9	88.7	93.5
	N.	91.	98.5	94.8	94.6	89.3	93.2	94.3	.....	85.8	87.1	75.6	77.9	103.6	108.7	85.3	.....	.....	98.3	96.2	101.	96.6	.....	.....	97.5	96.5	99.3	96.2	97.1	98.5	95.3	90.	94.7
	D.	93.4	90.7	97.	96.4	94.	93.3	93.9	89.8	.....	91.1	78.9	81.4	101.1	108.7	87.3	.....	.....	97.5	96.2	.....	96.6	.....	.....	96.1	96.3	90.8	90.7	.....	.....	95.3	90.	.....
1902	J.	93.	103.	99.3	98.1	100.2	97.4	96.7	.....	.....	93.4	82.3	81.4	90.6	.....	91.4	.....	.....	90.1	91.5	103.7	96.6	.....	87.3	97.5	96.9	98.8	92.9	.....	98.6	.....	94.8	.....
	F.	103.6	103.	103.3	103.4	101.9	100.9	103.2	.....	.....	95.	97.3	95.6	98.	106.8	91.4	.....	90.9	96.4	95.9	.....	100.3	95.4	99.3	97.5	95.7	98.5	95.1	106.1	105.3	93.9	95.5	103.8
	M.	103.6	104.6	101.5	105.1	105.	104.4	103.2	.....	101.4	.....	100.7	99.2	99.6	107.8	103.6	90.7	98.9	97.7	96.3	.....	107.5	95.4	.....	98.2	95.7	96.5	104.	106.1	.....	96.3	100.3	.....
	A.	105.	103.	101.5	105.1	106.6	102.6	109.5	103.7	.....	99.	100.7	102.7	102.6	107.8	103.6	103.3	97.	104.	101.	100.8	111.1	95.4	111.1	98.4	98.5	98.5	104.	104.3	100.7	96.8	99.6	.....
	M.	105.	106.2	103.3	105.1	106.6	104.4	106.9	.....	105.3	103.	103.4	106.2	104.3	104.9	105.6	103.3	97.	107.8	105.	107.4	109.3	97.8	103.3	97.6	95.9	101.1	104.	100.7	98.5	96.1	102.3	.....
	J.	106.4	104.6	101.5	105.1	106.6	107.9	106.9	.....	105.3	103.	106.8	113.3	102.6	106.8	105.6	104.9	97.	109.1	109.	107.4	111.1	97.8	.....	103.1	103.6	101.1	104.	97.1	103.	98.3	107.3	107.2
	J.	107.8	104.6	94.8	105.1	106.6	107.9	108.9	.....	105.3	105.6	107.5	116.9	102.6	106.8	105.6	110.2	109.1	109.1	111.7	106.5	109.3	103.6	103.3	101.7	103.8	101.1	104.	98.9	100.7	101.7	108.5	104.9
	A.	107.8	104.6	94.8	105.1	105.	109.6	108.9	.....	.....	105.6	107.5	116.9	101.1	108.7	103.6	110.2	109.1	109.1	111.7	109.3	109.3	104.5	103.2	103.1	102.6	102.4	101.8	100.7	103.	101.	108.5	107.2
	S.	106.4	104.6	97.	105.1	105.	107.9	.....	106.	101.4	108.9	109.1	113.3	102.6	110.7	105.6	110.3	106.1	109.1	110.4	.....	107.5	.....	111.1	103.1	104.	106.3	104.	100.7	103.	101.	109.8	107.2
	O.	107.8	106.2	101.5	105.1	106.6	106.1	106.9	.....	103.3	106.9	114.2	120.4	104.3	109.7	107.6	.....	109.1	110.4	110.4	.....	107.5	107.8	119.1	101.7	103.6	102.4	104.	100.7	103.	101.	110.5	107.2
	N.	109.2	106.2	99.3	105.1	106.6	107.9	106.9	108.7	.....	108.2	114.2	123.9	103.6	107.8	107.6	110.3	109.1	110.4	110.4	.....	111.1	.....	.....	101.7	104.	.....	104.	106.1	105.2	103.9	110.5	107.2
	D.	107.8	104.6	97.	105.1	106.6	106.1	105.6	108.7	.....	109.6	115.8	120.4	98.	107.8	109.7	.....	115.3	110.4	110.4	.....	105.7	110.3	.....	101.	103.4	101.1	106.3	106.1	105.2	.....	111.2	104.9
1903	J.	107.8	104.6	99.3	105.1	108.3	106.1	104.4	106.7	105.3	110.9	114.2	123.9	99.6	108.7	111.7	104.9	109.1	109.1	110.4	106.5	103.3	108.6	111.1	101.	103.6	102.4	106.2	98.9	.....	.....	110.5	107.2
	F.	107.8	104.6	97.	105.1	106.6	106.1	103.1	106.7	107.3	110.9	115.8	116.3	98.	108.7	109.7	102.3	109.1	109.1	110.4	105.6	103.	113.8	103.2	103.1	104.	101.1	106.2	104.3	100.7	108.9	110.5	108.3
	M.	106.4	104.6	101.5	105.1	108.3	106.1	101.8	107.8	.....	113.3	120.9	116.9	102.6	106.7	113.7	104.9	115.3	109.1	110.4	106.3	103.	.....	103.2	103.1	103.6	106.3	108.4	98.9	100.7	.....	111.2	108.3
	A.	106.4	104.6	103.8	105.1	108.3	107.9	101.8	107.8	109.2	110.9	119.2	116.9	104.3	109.7	111.7	104.9	113.3	110.4	111.7	104.7	103.	.....	.....	104.5	102.3	103.7	112.8	.....	96.2	108.2	111.2	107.2
	M.	106.4	103.	103.8	105.1	106.6	106.1	103.1	107.8	111.1	109.6	119.2	116.9	103.6	.....	113.7	107.6	115.3	109.4	111.7	106.5	100.2	113.6	107.2	103.1	103.4	102.4	117.3	102.5	100.7	108.3	111.2	107.2
	J.	105.	103.3	101.5	105.1	106.6	104.4	101.8	106.	109.2	109.6	117.5	109.8	104.3	106.7	111.7	107.6	109.1	110.4	110.4	107.4	98.4	.....	.....	101.7	103.3	101.1	117.3	102.5	100.7	108.3	110.6	104.9
	J.	105.	103.	103.3	103.4	106.6	104.4	99.3	105.1	113.1	110.9	117.5	109.8	104.3	106.7	111.7	.....	109.1	109.1	110.4	.....	100.2	.....	107.2	102.4	103.8	105.	117.3	98.9	103.	100.7	111.2	.....
	A.	103.6	103.	101.5	105.1	106.6	104.4	100.5	.....	109.2	108.2	115.8	109.8	104.3	.....	111.7	.....	108.	109.1	110.4	.....	100.2	.....	103.2	101.7	103.4	102.4	115.	102.5	105.2	107.5	109.1	104.9
	S.	103.2	101.5	101.5	103.4	106.6	102.6	101.8	.....	.....	106.9	113.5	103.7	105.7	.....	113.7	.....	103.	109.1	110.4	104.7	102.	.....	87.3	103.4	103.6	102.4	115.	104.3	105.2	106.8	110.5	104.9
	O.	103.6	101.5	101.5	103.4	105.	105.1	96.	.....	.....	103.	110.8	99.2	105.7	104.9	111.7	.....	103.	108.5	106.4	.....	100.2	111.9	91.3	101.	104.	105.	115.	104.3	107.4	106.1	109.8	104.9
	N.	103.2	101.5	101.5	103.4	105.	104.4	95.7	104.2	105.3	101.6	105.3	92.1	105.7	.....	109.7	89.2	97.	104.	103.3	105.6	102.	111.9	99.2	103.4	103.8	105.	112.8	104.3	105.2	.....	109.8	104.9
	D.	103.2	99.9	100.8	103.4	105.	106.1	99.3	.....	107.2	101.6	105.8	90.3	105.7	.....	111.7	89.3	97.	101.5	99.6	104.7	107.5	111.9	103.2	104.	103.8	106.3	112.8	.....	100.7	105.4	.....	.....
1904	J.	99.4	103.	103.8	103.4	105.	106.1	101.8	105.1	.....	101.6	104.1	99.2	104.3	.....	109.7	.....	.....	90.2	98.8	107.4	107.5	111.9	103.2	103.1	103.2	.....	112.8	100.7	100.7	108.8	108.5	109.5
	F.	100.8	101.5	103.8	102.4	106.6	106.1	101.3	.....	.....	99.	94.	93.1	102.6	105.8	109.7	83.9	.....	97.7	98.9	.....	107.5	.....	107.2	103.1	103.4	105.	115.	98.9	98.5	106.1	107.8	110.6
	M.	100.8	101.5	103.8	103.4	106.6	107.9	101.8	.....	111.1	96.4	93.3	85.	104.3	106.8	107.6	73.5	.....	95.1	98.9	.....	105.7	112.8	107.2	103.1	103.4	105.	112.8	100.7	100.7	105.4	107.8	109.5
	A.	103.3	99.9	110.6	101.6	105.	107.9	103.1	.....	111.1	95.	90.7	81.4	104.3	108.7	109.7	73.5	75.8	98.9	88.3	.....	100.3	114.4	103.2	.....	103.6	106.3	112.8	98.9	96.2	108.8	107.1	108.3
	M.	103.2	101.5	110.6	99.9	105.	104.4	101.3	.....	.....	93.4	87.3	81.4	103.6	.....	109.7	63.	72.7	93.9	87.5	.....	100.3	.....	.....	99.6	102.8	103.7	115.	93.5	94.	108.2	106.4	.....
	J.	100.8	99.9	110.5	99.9	105.	107.9	99.3	106.9	111.1	89.8	83.9	81.4	104.3	107.8	109.7	60.3	75.8	90.1	84.8	.....	100.3	111.9	103.2	103.1	104.	105.	112.8	93.5	85.	107.5	106.4	108.3
	J.	103.6	101.5	112.8	101.6	105.	107.9	99.3	106.	.....	93.4	83.3	77.9	99.6	107.2	100.7	60.3	72.7	90.1	88.5	.....	107.5	.....	103.2	103.1	104.	103.4	112.8	91.7	82.8	107.5	107.1	109.5
	A.	103.2	101.5	110.6	101.6	106.6	106.1	99.3	.....	111.1	92.4	83.3	81.4	102.6	106.7	109.7	63.	.....	90.1	84.8	105.6	107.5	111.9	103.2	103.1	104.	103.7	112.8	91.7	91.8	105.4	107.1	110.6
	S.	103.2	99.9	101.6	101.6	105.	107.9	99.3	.....	.....	91.1	83.9	81.4	99.6	.....	101.5	.....	75.8	91.3	85.5	104.7	108.8	.....	103.2	103.1	103.2	103.7	112.8	91.7	96.3	106.8	106.4	111.8
	O.	102.3	99.9	112.8	101.6	105.	107.9	98.	104.2	113.1	92.4	85.6	81.4	99.6	100.7	107.6	.....	75.8	90.1	84.8	104.7	103.8	.....	99.2	103.1	102.8	102.4	112.8	98.9	99.5	106.8	105.7	110.6
	N.	103.2	99.9	112.8	101.6	105.	108.1	99.3	.....	.....	92.4	87.3	81.4	101.1	110.7	109.7	73.5	.....	90.1	84.8	104.7	103.8	111.9	.....	103.8	104.	.....	112.8	102.5	94.	108.2	105.7	114.1
	D.	105.	101.5	112.8	101.6	111.3	107.9	99.3	.....	117.	92.4	89.	81.4	101.1	.....	107.6	.....	75.8	87.5	84.8	.....	107.5	111.9	87.3	103.1	104.	106.2	110.6	102.5	107.4	.....	107.8	115.2
1905	J.	109.2	108.	117.3	108.4	112.9	109.6	101.8	.....	113.1	93.7	89.	85.	104.3	116.5	105.6	.....	78.8	90.1	84.8	102.8	109.3	.....	108.2	102.6	105.2	.....	112.8	98.9	105.2	.....	107.8	115.2
	F.	113.4	108.	121.8	108.4	116.	109.6	.....	107.8	113.1	92.4	87.3	85.	104.3	122.8	111.7	78.1	78.8	90.1	84.8	106.5	113.	110.3	108.2	108.8	104.	.....	112.8	100.7	107.4	116.8	108.5	120.9
	M.	113.4	104.6	119.6	109.9	114.4	111.3	110.7	.....	117.	96.4	90.7	88.5	102.6	125.2	111.7	78.7	81.8	91.3	90.2	107.4	113.	111.9	99.2	103.1	103.6	106.	112.8	102.5	109.7	119.8	108.5	120.9
	A.	112.	106.2	121.8	106.9	114.4	111.3	109.5	.....	117.	96.4	94.	92.1	111.8	127.2	116.3	78.7	84.8	93.9	91.5	107.4	116.6	111.9	96.3	104.5	104.	111.6	115.	102.5	112.	119.2	107.8	119.8
	M.	113.4	106.2	119.6	108.8	114.4	113.1	112.	.....	117.	99.	95.7	92.1	111.8	128.3	117.8	81.3	84.8	98.9	91.5	.....	116.6	111.1	107.2	106.6	103.6	110.2	117.3	107.9	114.2	119.8	108.5	118.6
	J.	114.8	106.2	121.8	108.6	111.3	111.3	113.3	.....	120.9	101.6	97.4	92.1	111.8	129.3	117.3	78.7	81.8	98.9	91.5	107.4	114.8	.....	.....	.....	104.	108.9	119.5	111.5	116.4	119.2	107.8	120.9
	J.	116.8	107.8	121.8	108.6	114.4	111.3	128.	.....	122.8	103.	97.4	92.1	107.2	127.2	119.3	83.9	84.8	95.1	92.9	114.8	118.6	112.8	108.2	.....	104.8	108.9	121.7	111.5	112.	121.1	108.5	119.8
	A.	117.6	111.	126.1	113.9	119.1	118.8	132.4	.....	130.9	103.	100.7	95.6	119.5	128.3	121.9	83.9	87.9	96.4	92.9	121.2	123.	113.8	103.2	110.	106.	120.6	119.5	113.3	112.	119.8	109.8	122.
	S.	117.6	112.6	126.1	117.4	120.7	120.	133.6	130.2	134.8	104.3	104.1	99.2	132.5	127.2	121.3	86.6	90.9	97.7	96.9	123.1	130.5	.....	103.2	109.1	109.1	120.6	123.9	116.9	118.7	123.6	111.9	122.
	O.	120.4	118.9	128.4	128.6	125.4	121.8	.....	129.3	140.4	108.2	107.5	99.2	123.3	128.3	127.9	86.6	97.	98.9	98.3	.....	142.1	113.6	109.2	108.6	109.5	121.	128.3	116.9	123.2	121.9	113.2	125.5
	N.	121.8	118.9	128.4	126.4	130.1	125.3	141.3	137.4	.....	110.9	114.2	106.3	136.3	128.3	130.	89.2	103.	98.9	98.3	.....	153.	111.9	121.	114.7	111.4	122.3	130.5	120.5	125.4	121.1	115.3	123.2
	D.	123.3	123.1	128.6	129.6	134.8	124.	142.5	.....	.....	112.3	117.5	109.3	136.3	129.2	122.	89.2	106.1	98.9	94.0	.....	153.	111.9	.....	119.8	119.	123.3	132.7	118.7	127.7	121.1	116.	125.5

Year	Month	I. 17.85	II. 15.77	III. 11.08	IV. 14.27	V. 15.86	VI. 14.37
1906	J.	124.6	128.7	130.9	131.4	136.4	124.
	F.	126.1	126.3	126.4	134.9	141.1	137.4
	M.	130.3	130.	139.9	143.7	147.3	144.4
	A.	135.9	134.7	145.7	149.8	152.	151.4
	M.	137.3	136.3	148.9	150.7	152.	153.1
	J.	135.9	136.8	148.9	148.9	150.6	151.4
	J.	137.3	134.7	148.9	148.9	152.	153.1
	A.	136.9	134.7	148.9	147.3	152.	151.4
	S.	137.3	134.7	148.9	147.3	153.	151.4
	O.	135.9	134.7	148.9	148.9	152.	151.4
	N.	137.3	134.7	146.7	147.2	152.	151.4
	D.	137.3	134.7	151.2	148.9	153.6	151.4
1907	J.	140.1	137.9	151.2	148.9	155.2	153.1
	F.	143.9	141.1	151.2	148.9	155.2	153.1
	M.	147.1	144.3	158.4	150.7	156.7	154.8
	A.	149.9	147.4	162.5	152.4	159.9	158.3
	M.	151.3	147.4	163.5	153.4	159.9	158.3
	J.	149.9	149.	163.5	153.4	159.9	158.3
	J.	151.3	147.4	164.7	154.2	161.4	158.3
	A.	149.9	147.4	163.5	153.4	159.9	158.3
	S.	149.9	147.4	163.5	153.4	161.4	158.3
	O.	149.9	147.4	160.2	153.4	163.	156.6
	N.	151.3	147.4	157.9	150.7	163.	154.8
	D.	148.5	145.8	157.9	150.7	.....	153.1
1908	J.	144.3	139.5	153.4	138.4	.....	149.6
	F.	141.5	137.9	148.7	136.7	147.3	143.7
	M.	141.5	139.5	148.7	133.1	146.8	139.3
	A.	140.1	136.3	148.7	133.1	136.4	137.4
	M.	138.7	134.7	139.9	137.9	133.3	133.3
	J.	137.3	131.6	137.6	132.6	133.3	130.6
	J.	140.1	133.2	135.4	119.1	130.1	133.3
	A.	141.5	134.7	137.9	120.9	136.4	133.3
	S.	143.9	133.2	133.1	120.9	133.3	133.3
	O.	145.7	131.6	135.4	120.9	133.3	138.7
	N.	144.3	130.	133.1	120.9	136.4	138.7
	D.	145.7	131.6	133.1	120.9	136.4	130.8
1909	J.	148.5	134.7	133.1	122.6	137.9	137.4
	F.	151.3	134.7	133.1	124.4	139.5	137.4
	M.	151.3	133.2	130.9	122.6	136.4	140.9
	A.	154.1	133.2	130.9	122.6	137.9	137.4
	M.	151.3	133.2	130.9	122.6	137.9	139.2
	J.	151.3	131.6	124.1	122.6	137.9	139.2
	J.	151.3	131.6	124.1	122.6	137.9	137.4
	A.	151.3	134.7	124.1	122.6	137.9	139.2
	S.	154.1	136.3	119.6	122.6	137.9	142.7
	O.	154.1	136.3	119.6	122.6	137.9	142.7
	N.	154.1	137.9	124.1	122.6	137.9	142.7
	D.	154.1	139.5	115.1	129.6	.....	140.9
1910	J.	155.5	134.7	115.1	122.6	137.9	142.7
	F.	159.7	137.9	117.3	126.1	136.4	140.7
	M.	161.1	137.9	126.4	126.1	137.9	142.7
	A.	165.3	139.5	124.1	127.9	137.9	142.7
	M.	166.7	139.5	126.4	129.6	137.9	140.9
	J.	163.1	141.1	128.6	129.6	137.9	144.4
	J.	166.7	141.1	121.8	131.4	136.4	146.1
	A.	165.3	143.7	126.4	129.6	137.9	146.1
	S.	.....	.....	.....	.....	.....	.....
	O.	.....	.....	.....	.....	.....	.....
	N.	.....	.....	.....	.....	.....	.....
	D.	.....	.....	.....	.....	.....	.....

CIES: 1896 TO 1910

XXX. 34.63	XXXI. 36.65	XXXII. 21.95		
94.6	75.4	88.7	J.	1901
94.9	81.2	87.8	F.	
94.6	83.9	90.1	M.	
.....	89.9	89.	A.	
95.1	82.6	89.	M.	
94.3	85.3	89.	J.	
95.9	85.9	90.1	J.	
95.6	86.	87.8	A.	
96.3	89.4	90.1	S.	
98.9	88.7	98.5	O.	
98.8	90.	94.7	N.	
98.3	90.	.....	D.	
.....	94.3	.....	J.	1902
98.4	95.6	103.8	F.	
98.3	100.3	.....	M.	
96.8	99.8	.....	A.	
98.1	102.3	.....	M.	
99.3	107.8	107.3	J.	
100.7	108.5	104.9	J.	
101.	108.5	107.2	A.	
101.	109.8	107.2	S.	
101.	110.5	107.2	O.	
103.9	110.5	107.2	N.	
.....	111.2	104.9	D.	
.....	110.5	107.2	J.	1903
103.9	110.5	108.3	F.	
.....	111.3	108.3	M.	
108.3	111.3	107.2	A.	
108.3	111.3	107.2	M.	
108.3	110.6	104.9	J.	
109.7	111.2	.....	J.	
107.5	109.1	104.9	A.	
108.8	110.5	104.9	S.	
108.1	109.8	104.9	O.	
.....	109.8	104.9	N.	
105.4	.....	.....	D.	
106.8	108.5	109.5	J.	1904
106.1	107.8	110.6	F.	
105.4	107.8	109.5	M.	
106.8	107.1	108.3	A.	
106.3	106.4	.....	M.	
107.5	106.4	108.3	J.	
107.5	107.1	109.5	J.	
106.4	107.1	110.6	A.	
106.8	106.4	111.8	S.	
106.8	105.7	110.6	O.	
106.3	105.7	114.1	N.	
.....	107.8	115.2	D.	
.....	107.8	115.2	J.	1905
118.8	108.5	120.9	F.	
119.8	108.5	120.9	M.	
119.2	107.8	119.8	A.	
119.8	108.5	118.6	M.	
120.2	107.8	120.9	J.	
121.1	108.5	119.8	J.	
119.8	109.8	122.	A.	
122.6	111.3	122.	S.	
121.9	113.2	125.5	O.	
121.1	115.8	123.2	N.	
121.1	116.	125.5	D.	

		I. 17.85	II. 16.77	III. 11.08	IV. 14.27	V. 15.96	VI. 14.37	VII. 19.64	VIII. 27.83	IX. 12.82	X. 13.94	XI. 14.59
1906	J.	134.6	129.7	130.9	131.4	136.4	134.	148.9	.....	.....	113.5	119.3
	F.	136.1	135.2	135.4	134.9	141.1	137.4	153.7	148.7	.....	113.5	119.3
	M.	130.3	130.	130.9	142.7	147.3	144.4	.....	147.8	159.9	113.5	122.6
	A.	135.9	134.7	146.7	140.8	153.	151.4	161.6	152.7	.....	117.5	127.6
	M.	137.3	136.3	148.9	150.7	153.	153.1	162.9	150.9	.....	124.1	132.6
	J.	135.9	136.3	148.9	148.9	150.6	151.4	162.9	150.9	.....	126.4	136.
	J.	137.3	134.7	148.9	148.9	153.	153.1	.....	.....	.....	125.4	136.
	A.	135.9	134.7	148.3	147.3	153.	151.4	150.1	.....	134.5	125.4	136.
	S.	137.3	134.7	148.9	147.3	153.	151.4	154.0	.....	.....	126.4	137.7
	O.	135.9	134.7	148.9	148.9	152.	151.4	153.7	144.6	132.6	125.4	130.4
	N.	137.3	134.7	146.7	147.2	153.	151.4	.....	.....	130.6	125.4	130.4
	D.	137.3	134.7	151.2	148.3	153.6	151.4	150.2	.....	133.6	125.4	141.
1907	J.	140.1	137.9	151.2	148.9	155.3	153.1	147.6	140.1	.....	125.4	141.
	F.	142.9	141.1	151.2	148.9	155.3	153.1	147.6	.....	.....	125.4	143.7
	M.	147.1	144.3	158.4	150.7	156.7	154.8	148.4	.....	143.8	125.4	.....
	A.	149.9	147.4	162.5	152.4	159.9	158.3	146.4	140.1	144.3	125.4	146.1
	M.	151.3	147.4	162.5	152.4	159.9	158.3	.....	.....	136.5	128.7	147.8
	J.	149.9	140.	163.5	152.4	159.8	158.3	143.3	.....	136.5	126.7	147.8
	J.	151.3	147.4	164.7	154.3	161.4	158.3	148.8	.....	132.6	125.4	151.1
	A.	149.9	147.4	162.5	152.4	159.9	158.3	148.8	134.7	132.6	128.7	146.1
	S.	149.3	147.4	162.5	152.4	161.4	160.3	148.8	.....	130.6	125.4	144.4
	O.	149.9	147.4	160.2	152.4	162.	156.6	148.5	.....	130.6	134.1	142.7
	N.	151.3	147.4	157.9	150.7	162.	154.8	148.5	.....	.....	132.8	141.
	D.	148.5	145.8	157.9	150.7	.....	152.1	141.3	.....	126.7	131.4	137.7
1908	J.	144.3	139.5	162.4	128.4	.....	140.6	133.6	129.6	134.3	120.1	126.
	F.	141.5	137.9	146.7	126.7	147.3	142.7	.....	131.3	124.8	120.1	122.6
	M.	141.5	139.5	146.7	128.1	145.8	139.3	135.6	.....	126.7	117.6	122.6
	A.	140.1	138.5	146.7	128.1	136.4	137.4	128.4	.....	.....	117.5	127.6
	M.	139.7	134.7	139.9	127.9	130.3	135.3	128.5	.....	128.6	112.3	123.6
	J.	137.2	131.6	137.6	128.6	132.3	130.5	128.	.....	117.	110.9	119.3
	J.	140.1	133.2	135.4	119.1	130.1	132.3	132.3	119.4	117.	110.9	114.3
	A.	141.5	134.7	129.9	120.9	126.4	133.3	119.6	133.	115.	110.9	114.3
	S.	143.9	130.3	129.1	120.9	133.3	132.3	118.4	.....	113.9	113.3	110.8
	O.	145.7	131.6	135.4	120.9	133.3	138.7	133.3	136.7	118.9	113.5	115.8
	N.	144.3	130.	138.1	120.9	136.4	138.7	137.3	.....	120.6	118.8	119.3
	D.	145.7	131.6	138.1	120.3	136.4	130.5	131.1	136.6	122.6	124.1	120.9
1909	J.	148.5	134.7	133.1	122.6	137.9	137.4	134.9	138.4	136.5	136.7	119.3
	F.	151.3	134.7	128.1	124.4	139.5	137.4	138.7	.....	136.5	130.4	122.6
	M.	151.3	133.3	130.9	122.6	136.4	140.9	143.5	137.4	134.5	132.	123.6
	A.	154.1	133.3	130.9	122.6	137.9	137.4	134.9	135.6	123.6	132.	132.6
	M.	151.3	133.2	130.9	122.6	137.9	139.3	135.4	.....	124.8	130.7	119.3
	J.	151.3	131.6	134.1	122.6	137.9	139.3	139.8	133.9	118.9	130.7	115.8
	J.	151.3	131.6	124.1	122.6	137.9	137.4	135.	131.1	122.8	130.4	117.5
	A.	151.3	134.7	124.1	122.6	137.9	139.3	139.8	130.4	126.7	130.7	119.3
	S.	154.1	136.3	119.6	122.6	137.9	142.7	139.8	.....	128.7	130.7	124.3
	O.	154.1	136.3	119.6	122.6	137.9	142.7	134.9	.....	134.5	133.	136.9
	N.	154.1	137.9	124.1	122.6	137.9	142.7	138.4	138.4	136.5	136.	130.9
	D.	154.1	139.5	115.1	125.6	.....	140.9	138.6	131.1	132.6	136.	130.9
1910	J.	155.5	134.7	135.1	122.6	137.9	142.7	128.4	122.9	138.7	130.7	134.3
	F.	159.7	137.9	117.3	126.1	136.4	142.7	124.9	128.6	.....	134.6	134.3
	M.	161.1	137.9	126.4	126.1	137.9	142.7	128.4	135.6	130.6	132.	135.9
	A.	165.3	139.5	124.1	127.9	137.9	142.7	129.3	128.5	132.6	132.	131.
	M.	165.7	139.5	126.4	129.6	137.9	140.9	126.5	.....	130.6	132.	132.6
	J.	163.1	141.1	126.6	129.6	137.9	144.4	129.3	133.9	134.8	132.	133.6
	J.	166.7	141.1	121.8	121.4	136.4	145.1	129.8	135.6	132.8	130.7	132.6
	A.	165.3	142.7	128.4	129.6	137.9	146.1	129.3	135.6	136.7	.....	127.6
	S.	.....	.....	.....	.....	.....	.....	133.4	137.4	134.8	.....	.....
	O.	.....	.....	.....	.....	.....	.....	.....	136.6	134.8	.....	.....
	N.	.....	.....	.....	.....	.....	.....	129.8	.....	136.7	.....	.....
	D.	.....	.....	.....	.....	.....	.....	128.5	.....	136.7	.....	.....

		XII. 7.06	XIII.	XIV. 25.75	XV. 12.31	XVI. 9.65	XVII. 8.36	XVIII. 19.71	XIX. 18.57	XX. 27.32	XXI. 13.07	XXII. 31.52
1906	J.	113.3	126.3	139.2	134.	104.9	106.1	98.9	98.3	136.8	166.7	114.4
	F.	127.5	130.4	136.3	140.1	118.	115.2	100.2	98.3	136.9	171.3	116.1
	M.	134.6	130.4	131.1	146.3	118.	127.3	101.5	99.6	.....	163.3	121.9
	A.	145.3	137.9	130.1	166.4	118.	136.4	104.	102.3	144.1	169.3	122.7
	M.	163.9	137.1	130.1	158.4	128.3	145.5	105.3	105.7	.....	163.3	122.7
	J.	163.9	123.5	132.	156.4	141.7	145.5	104.	102.3	144.1	174.9	122.7
	J.	162.9	111.8	132.	.....	141.7	146.5	105.3	103.3	.....	162.1	122.7
	A.	162.9	111.8	131.1	156.4	141.7	146.5	104.	102.3	136.0	158.	121.9
	S.	166.4	110.3	132.	154.8	144.3	154.5	105.3	103.7	.....	151.3	122.7
	O.	170.	113.4	131.1	154.3	144.3	154.5	104.	102.3	125.9	147.6	121.9
	N.	170.	111.8	130.1	152.3	146.9	154.5	104.	102.3	130.8	142.1	121.1
	D.	177.1	111.8	131.1	148.3	144.3	157.6	105.3	103.7	.....	142.1	122.7
1907	J.	177.1	110.3	129.1	153.3	144.3	160.6	104.	106.3	.....	138.5	121.9
	F.	177.1	112.4	126.3	158.4	.....	160.6	104.	105.7	137.7	136.6	120.3
	M.	180.6	114.9	129.4	164.5	.....	163.6	104.	103.7	.....	134.8	120.3
	A.	184.1	119.5	130.4	164.5	144.3	162.6	105.3	103.3	125.9	136.6	121.1
	M.	184.1	118.	.....	166.5	149.5	163.6	106.3	103.7	.....	134.8	120.3
	J.	180.6	114.9	113.6	163.6	149.5	160.6	105.3	103.7	.....	130.	.....
	J.	184.1	111.8	112.6	164.5	149.5	157.6	105.3	105.	136.3	131.2	117.7
	A.	186.6	111.8	110.7	164.5	149.5	162.6	105.3	105.7	.....	133.	118.6
	S.	173.5	110.3	108.7	166.5	141.7	163.6	106.5	103.7	136.9	133.	122.7
	O.	170.	114.9	110.7	164.5	130.	160.6	106.5	105.	136.9	131.2	121.9
	N.	159.3	114.9	112.6	160.4	133.8	164.5	107.3	105.	136.9	131.2	119.4
	D.	153.3	110.3	114.6	.....	136.4	151.5	107.3	103.7	134.	136.7	119.4
1908	J.	145.3	114.3	121.4	158.4	125.9	.....	106.5	106.4	125.9	137.5	116.6
	F.	146.7	114.9	125.2	.....	125.3	.....	106.5	103.7	134.	136.7	117.7
	M.	141.6	110.3	125.2	132.	125.3	133.3	106.5	105.	126.9	136.7	115.3
	A.	127.5	113.4	126.2	127.9	113.8	.....	106.5	105.	134.	125.7	114.4
	M.	116.9	111.2	.....	125.9	104.9	112.1	106.5	105.	134.	120.2	111.9
	J.	109.8	111.8	118.4	119.8	99.7	112.1	105.3	105.	134.	114.8	112.8
	J.	106.3	111.8	119.4	121.9	99.7	106.1	106.5	105.	132.2	113.	113.6
	A.	102.7	114.9	118.4	117.8	91.8	109.1	106.5	105.	133.1	113.	116.1
	S.	99.3	119.5	117.5	125.3	97.1	106.1	106.5	105.	133.1	113.	119.4
	O.	105.7	124.1	117.5	130.	94.4	97.	106.5	106.4	137.7	114.8	120.2
	N.	102.7	124.3	119.4	130.	94.4	103.	106.5	105.	142.3	128.9	117.7
	D.	116.9	140.9	120.4	131.9	99.7	106.1	106.5	105.	146.	131.2	120.3
1909	J.	127.5	134.8	137.3	135.9	110.2	115.2	107.3	106.4	147.3	133.	130.3
	F.	127.5	.....	.....	132.	107.6	115.2	109.1	107.7	152.3	136.5	131.9
	M.	129.9	136.3	121.1	127.9	112.8	116.3	109.1	109.	150.6	134.3	133.5
	A.	130.4	134.8	131.1	133.	107.6	113.1	110.4	109.	140.7	130.4	118.6
	M.	116.9	130.3	128.3	127.9	103.3	112.1	110.4	109.	148.	127.5	116.1
	J.	109.8	121.7	.....	128.9	102.3	106.1	110.4	107.7	145.1	125.7	111.1
	J.	109.8	130.3	124.3	125.9	104.9	106.1	110.4	109.	144.1	129.1	110.3
	A.	118.3	129.7	124.3	132.	107.6	.....	109.1	109.	146.9	127.5	113.6
	S.	116.9	128.7	118.4	133.	.....	.....	110.4	107.7	146.9	131.2	116.9
	O.	120.4	129.7	118.4	.....	.....	.....	110.4	109.	147.3	134.8	121.1
	N.	116.9	127.1	118.4	130.1	.....	.....	110.4	109.	147.3	134.8	121.1
	D.	.....	125.6	118.4	.....	.....	.....	109.1	109.	146.9	134.8	128.5
1910	J.	120.4	123.5	.....	136.1	104.9	.....	109.1	107.7	146.9	125.	125.3
	F.	123.9	123.5	.....	136.1	104.3	.....	106.5	109.	147.8	124.8	125.9
	M.	127.5	135.6	.....	128.1	104.9	.....	109.1	107.7	147.8	128.	.....
	A.	127.5	127.1	.....	142.3	107.6	.....	109.1	107.7	148.7	124.3	126.9
	M.	131.	127.1	.....	144.3	115.4	.....	110.4	109.	151.5	126.6	129.4
	J.	131.	128.5	.....	144.3	115.4	.....	107.8	106.4	152.4	126.6	127.7
	J.	131.	116.4	.....	143.3	.....	.....	109.1	107.7	150.6	134.8	136.
	A.	131.	.....	.....	143.3	.....	.....	.....	109.	151.5	133.	119.4
	S.	.....	.....	.....	.....	.....	.....	.....	.....	150.6	134.8	116.1
	O.	.....	.....	.....	.....	.....	.....	.....	.....	148.7	133.	116.1
	N.	.....	.....	.....	.....	.....	.....	.....	.....	145.1	134.8	115.3
	D.	.....	.....	.....	.....	.....	.....	.....	.....	146.9	131.2	112.8

		XXIII. 6.29	XXIV.	XXV.	XXVI.	XXVII. 11.50	XXVIII. 12.37 13.91	XXIX. 10.78 11.18	XXX. 34.63	XXXI. 36.65	XXXII. 21.95		
1906	J.	121.	125.3	119.9	132.2	137.2	132.3	125.4	121.1	116.	120.	J.	1906
	F.	131.	125.3	127.6	136.2	141.6	.....	133.1	121.1	118.	121.3	F.	
	M.	127.	125.3	127.	136.2	150.4	133.1	134.4	121.1	116.6	125.7	M.	
	A.	127.	125.3	127.6	136.2	159.3	143.9	136.7	136.9	121.4	136.9	A.	
	M.	131.	126.1	127.6	129.4	163.7	.....	143.4	127.6	120.7	139.1	M.	
	J.	127.	126.7	128.	128.2	163.7	143.1	141.3	136.9	121.4	139.1	J.	
	J.	127.	126.3	127.6	114.1	161.5	142.1	141.3	129.4	121.4	136.9	J.	
	A.	135.	125.3	127.2	116.7	161.5	142.1	141.3	129.4	120.7	136.9	A.	
	S.	142.9	126.9	128.4	119.3	150.3	142.1	145.7	129.1	121.4	136.9	S.	
	O.	142.9	125.3	127.2	116.9	157.1	142.1	148.	129.9	121.4	135.7	O.	
	N.	142.9	125.3	127.2	116.7	154.9	140.3	150.2	129.3	121.4	135.7	N.	
	D.	142.9	125.3	127.2	116.7	154.9	138.5	150.2	129.3	121.4	136.9	D.	
1907	J.	139.9	125.8	127.6	.....	153.7	140.3	150.2	130.5	121.4	140.3	J.	1907
	F.	.....	125.8	127.6	.....	163.7	142.1	.....	133.4	121.4	141.4	F.	
	M.	142.9	123.3	127.2	134.5	165.9	140.3	154.7	.....	121.4	143.7	M.	
	A.	142.9	125.3	127.6	125.8	172.6	140.3	154.7	129.3	121.4	146.	A.	
	M.	142.9	124.7	128.	124.5	173.6	145.7	163.6	135.7	121.4	146.	M.	
	J.	142.9	130.	127.6	116.7	174.8	172.	160.6	135.7	121.4	144.8	J.	
	J.	.....	129.9	126.8	111.5	172.6	161.6	162.4	127.2	120.7	146.	J.	
	A.	.....	130.9	126.8	114.1	170.4	165.7	153.	126.4	121.4	147.1	A.	
	S.	142.9	130.9	126.8	114.1	168.1	.....	141.4	131.3	121.4	148.3	S.	
	O.	142.9	126.3	128.	115.4	168.1	147.3	139.9	130.6	121.4	150.5	O.	
	N.	142.9	125.3	124.9	111.6	159.3	137.4	.....	126.9	120.7	149.4	N.	
	D.	142.9	.....	117.	112.8	.....	.....	.....	125.4	.....	148.3	D.	
1908	J.	135.	114.2	117.	114.1	159.2	103.1	99.7	124.	116.	140.3	J.	1908
	F.	131.	116.5	111.9	112.8	161.5	101.1	88.1	122.6	115.3	139.1	F.	
	M.	119.1	122.6	111.9	106.3	143.6	103.1	85.8	121.1	114.6	141.4	M.	
	A.	110.1	125.3	124.1	108.9	132.7	103.1	81.3	119.2	113.2	144.8	A.	
	M.	111.1	126.7	126.4	108.3	128.3	105.1	75.8	120.5	113.2	.....	M.	
	J.	108.2	118.4	122.5	106.3	123.9	103.1	76.5	120.5	113.2	.....	J.	
	J.	95.3	114.2	106.7	106.3	121.7	101.1	81.3	122.6	113.2	146.	J.	
	A.	95.3	112.4	111.4	112.8	128.3	115.2	88.1	124.	114.6	149.4	A.	
	S.	87.3	115.6	109.1	114.1	126.1	127.3	90.4	125.5	114.6	150.5	S.	
	O.	79.4	110.	109.1	119.3	130.5	139.5	88.1	131.3	116.	148.3	O.	
	N.	71.5	111.9	115.8	124.5	130.5	139.5	97.5	.....	118.7	150.5	N.	
	D.	71.5	117.9	118.8	.....	138.3	148.5	109.	.....	118.	150.5	D.	
1909	J.	.....	130.9	125.9	124.5	132.7	145.6	111.3	134.9	118.7	150.5	J.	1909
	F.	79.4	132.8	126.4	.....	132.7	145.6	106.7	135.7	108.7	153.3	F.	
	M.	95.4	130.3	128.7	.....	130.5	145.6	106.7	136.4	118.7	153.8	M.	
	A.	79.4	129.5	124.1	125.8	132.7	141.4	102.	.....	118.7	165.1	A.	
	M.	79.4	128.8	124.1	124.5	133.7	137.4	93.8	134.1	118.7	156.3	M.	
	J.	75.4	127.7	127.6	121.9	128.3	121.3	95.3	134.1	118.7	156.3	J.	
	J.	75.4	129.1	127.	120.6	130.6	121.3	95.3	134.1	118.7	156.3	J.	
	A.	75.4	127.3	121.1	121.9	130.5	129.3	116.	132.7	118.7	160.8	A.	
	S.	79.4	128.6	121.7	121.9	135.	.....	111.3	134.1	124.1	162.	S.	
	O.	71.5	128.1	125.2	121.9	130.4	.....	104.2	125.7	124.1	163.1	O.	
	N.	79.4	129.5	125.2	121.9	137.2	131.4	104.2	137.2	124.1	162.	N.	
	D.	.....	130.3	125.9	121.9	130.4	128.4	106.7	137.9	124.1	159.7	D.	
1910	J.	79.4	120.	127.6	128.3	132.7	135.4	109.	139.2	127.6	164.3	J.	1910
	F.	79.4	128.9	127.6	.....	137.3	.....	122.9	.....	129.6	164.3	F.	
	M.	.....	124.	120.4	121.9	137.3	135.4	116.	140.7	130.3	163.	M.	
	A.	75.4	123.1	127.	121.9	141.6	137.4	118.2	142.8	133.7	165.4	A.	
	M.	71.5	126.7	127.	128.2	142.3	133.4	118.5	142.5	133.7	164.2	M.	
	J.	75.4	128.1	128.3	121.9	141.6	133.4	111.3	142.1	134.4	164.3	J.	
	J.	79.4	119.8	127.	118.	141.6	135.4	.....	139.2	.....	163.1	J.	
	A.	79.4	119.8	127.	.....	141.6	135.4	116.	141.4	.....	.....	A.	
	S.	83.4	116.3	127.6	.....	.....	127.4	106.7	.....	.....	.....	S.	
	O.	.....	117.	.....	.....	.....	127.4	102.	.....	.....	.....	O.	
	N.	.....	.....	.....	.....	.....	129.8	104.2	.....	.....	.....	N.	
	D.	.....	.....	.....	.....	.....	126.3	104.2	.....	.....	.....	D.	

IV. RELATIVE PRICES OF LUMBER AND OF "ALL COMMODITIES" IN THE UNITED STATES AND IN CANADA; PRICES OF SUBSTITUTES FOR LUMBER.

TABLE 12.	1890	1891	1892	1893	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	Base
All Commodities; United States[1]	101.1	100.	95.2	94.7	86.1	83.8	80.9	80.3	82.6	91.2	98.	97.2	101.1	101.7	101.2	102.3	109.7	115.9	110.1	112.2	117.7	115.6	119.4	....
Lumber, Canada[2]	84.9	84.3	85.7	85.1	85.9	84.4	73.7	77.1	74.5	72.6	88.6	94.1	100.1	105.8	107.8	110.1	125.3	135.6	133.5	136.9	131.9	135.5	138.4	....
Lumber, United States[3]	84.1	88.2	82.7	82.4	80.3	79.	78.2	77.	78.	85.8	94.5	92.1	100.7	107.3	108.	111.6	126.1	137.3	127.4	130.7	138.3	135.3	140.	....
All Commodities; Canada[4]	101.4	90.3	94.1	88.8	83.3	87.8	85.	84.7	82.3	92.3	98.5	98.5	100.3	101.4	102.3	104.5	110.4	115.9	111.	111.2	114.1	117.	128.4	....
White Pine Boards; No. 2 Barn[5]	73.7	79.6	75.3	81.3	78.3	78.9	72.3	69.4	66.	80.2	94.4	91.7	103.	105.3	100.3	108.	130.5	147.	143.	145.3	150.3	150.7	148.3	22.70
White Pine Boards; Uppers[6]	61.4	62.7	64.1	67.7	64.6	64.	65.	64.5	64.2	70.4	80.2	84.2	104.3	111.4	112.9	114.2	118.	130.	128.6	134.4	131.4	134.4	135.2	71.70
Hemlock[7]	73.4	73.5	77.6	76.6	73.8	70.8	70.4	69.4	74.1	85.3	102.9	94.5	98.8	105.7	107.1	112.6	137.9	140.3	131.7	128.8	130.	130.4	135.2	15.91
Maple Boards; 1s and 2s[8]	91.5	91.5	91.5	91.5	91.5	91.5	91.5	91.5	91.5	91.6	95.	92.3	98.6	109.1	105.9	106.1	106.9	111.3	109.	106.9	108.7	118.8	135.6	28.98
Plain White Oak Boards[9]	92.5	90.1	94.3	95.	91.2	89.7	89.7	89.7	89.7	95.5	108.	90.	100.1	109.8	112.8	116.	123.4	125.3	120.7	118.6	122.8	124.	137.8	40.82
Quartered White Oak[10]	78.3	81.6	80.7	80.7	77.8	81.1	88.	87.1	78.9	83.2	98.3	90.1	96.1	113.8	122.1	122.3	120.7	121.3	122.	120.3	128.8	122.9	131.3	65.02
Yellow Poplar Rough Boards[11]	101.	97.2	90.1	90.1	90.1	88.3	79.3	79.9	90.9	97.6	100.8	95.8	102.1	102.1	104.1	121.1	142.6	148.4	148.4	160.6	149.3	148.9	161.3	42.85
Eastern Spruce Dimension[12]	71.2	71.2	71.5	78.7	79.3	72.8	72.8	72.1	70.	79.6	88.1	85.2	98.4	115.9	117.5	112.6	119.	135.6	136.1	134.5	148.8	144.1	148.8	18.51
Yellow Pine Siding[13]	86.7	75.6	79.	72.2	67.6	75.7	75.7	74.4	73.1	81.9	92.5	85.7	102.3	101.9	108.9	113.9	135.8	137.6	110.4	134.1	130.8	129.1	148.3	20.56
White Pine; Mill Run[14]	....	72.	72.	75.	72.	72.	72.	75.	72.	75.	90.	90.	90.	102.	102.	105.	111.	129.	123.	132.	123.	120.	138.	16.67
White Pine; Good Sidings[15]	100.	100.	90.	96.1	96.1	87.8	86.3	80.	87.4	90.8	98.3	97.3	94.3	108.5	112.5	108.5	111.4	112.1	112.1	116.6	134.	160.	145.9	37.42
White Pine; No. 1 and Better[16]	81.9	84.1	80.4	91.7	91.7	81.7	80.6	87.7	87.1	87.7	87.7	87.7	92.8	119.6	122.3	129.3	122.1	122.9	122.6	115.4	130.4	161.7	168.1	37.68
White Pine; Shipping Culls; Sidings[17]	91.4	91.4	91.1	91.4	91.4	85.5	85.3	80.	65.3	74.3	94.9	97.6	97.3	105.1	111.3	111.6	129.5	157.1	161.6	152.7	137.4	152.2	173.6	16.40
Hemlock[18]	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	100.	108.3	111.3	108.5	98.5	108.8	106.3	12.25
Spruce—Merchantable Deals[19]	78.7	75.6	77.1	76.7	87.5	75.5	72.9	76.6	82.1	81.2	82.3	91.1	101.	107.9	96.4	107.7	117.7	115.1	117.1	120.1	120.9	114.4	114.2	12.65
Birch—Common and Better[20]	94.	94.	96.6	96.6	97.3	122.7	110.9	90.3	90.2	90.3	90.3	90.3	93.3	101.6	119.	117.7	128.3	129.	127.4	126.4	128.3	151.4	154.9	19.15
Maple—soft; Common and Better[21]	85.	85.	87.6	87.8	86.9	90.2	88.2	87.6	87.6	80.3	82.9	82.9	100.9	106.2	121.3	118.2	117.3	117.6	119.5	117.4	112.	130.9	130.3	18.88
Plain Red Oak; 1s and 2s[22]	78.	79.1	79.1	81.9	91.8	91.8	91.4	88.6	88.6	88.6	91.	88.6	101.4	102.1	128.	142.4	162.	158.	158.8	168.2	158.3	171.	160.9	81.66
Lumber and Building Materials[23]	95.4	91.3	98.5	95.7	90.9	79.1	78.5	78.	90.5	89.	97.4	98.2	99.8	108.	108.	107.2	117.8	122.4	111.9	116.2	120.8	127.2	124.5	....
Portland Cement—Domestic[24]	....	....	....	....	....	100.6	104.2	100.5	102.1	104.6	110.2	96.7	90.7	108.5	74.7	72.	80.5	84.1	74.6	72.1	74.	74.1	67.2	1.90
Common Domestic Building Brick[25]	116.4	100.4	101.4	102.6	87.9	98.5	89.	98.8	101.3	100.	92.4	101.4	94.7	103.9	131.3	142.5	150.4	108.2	89.2	112.3	100.6	108.6	118.9	5.69
Common Rockport Lime[26]	124.1	116.8	117.8	117.8	107.5	98.	87.9	85.8	94.	101.1	98.7	98.2	102.	99.8	104.5	112.9	120.2	120.4	132.5	132.5	132.5	140.7	137.6	.79
Steel Billets[27]	110.5	92.8	85.8	74.2	90.2	67.2	68.4	54.7	55.6	112.	91.1	87.7	111.	101.3	80.5	87.2	90.7	106.1	95.6	89.5	92.2	77.8	81.4	27.55

KEY TO TABLE 12:

[1] United States Department of Commerce and Labor, Bureau of Labor, Bull. Nos. 39, 45, 51, 57, 63, 69, 75, 81, 87, 93, 99; Department of Labor, Bureau of Labor Statistics, Bull. No. 114 (255 commodities).

[2] Department of Labour of the Dominion of Canada, Wholesale prices, including: White pine, mill run, Ottawa; white pine, good sidings, Ottawa; white pine, No. 1, Toronto; white pine lath, Ottawa; white pine, shipping culls, sidings, Ottawa; white pine box boards, Ottawa; hemlock dimension, Ottawa; spruce, merchantable deals, St. John, N. B.; birch, common and better, Toronto; soft maple, common and better, Toronto; plain red oak, firsts and seconds, Toronto; Douglas fir, of British Columbia, Winnipeg; Douglas fir, f.o.b. mills, "railway belt," British Columbia.

[3] See Table 12, [5] to [22], inclusive; also cypress shingles, first quality f.o.b. New Orleans; red cedar shingles, clear, f.o.b. mills, Washington. Index of Bureau of Labor Statistics.

[4] Wholesale prices, Department of Labour of the Dominion of Canada (272 commodities).

[5] Rough: 10"; Buffalo, 1890-1906; New York, 1907-1912; N. Y. L. T. J.

[6] Rough or dressed: 1"x8" and up; Buffalo, 1890-1906; New York, 1907-1912; N. Y. L. T. J.

[7] Base price, Pa. and W. Va. stock; N. Y. L. T. J.

[8] Hard and soft: 1"x6" and up; New York; N. Y. L. T. J.

[9] Mixed, rock and W. Va. stock; 1"x6" and up; New York; N. Y. L. T. J.

[10] Indiana stock; clears and good seconds; 6" and up wide x 10—16' long; New York; N. Y. L. T. J.

[11] 1s and 2s; 1"x7—17" and up; New York; N. Y. L. T. J.

[12] Cargoes, 6" to 9"; New York; N. Y. L. T. J.

[13] Longleaf heartface boards: 1" and 1¼"; New York; N. Y. L. T. J.

[14] All grades; average from large mills in Ottawa Valley; f.o.b. mills.

[15] 1"x7" and up; Ottawa.

[16] 1"; Toronto.

[17] Ottawa.

[18] Ottawa.

[19] 3"x7" and 9" and up; St. John.

[20] 1"; Toronto.

[21] 1"; Toronto.

[22] 1"; Toronto.

[23] 25 commodities; U. S. Department of Labor; Bureau of Labor Statistics.

[24] New York; per barrel of 400 pounds; New York Journal of Commerce and Commercial Bulletin.

[25] New York, per 1,000 delivered on dock.

[26] New York, per barrel of 300 pounds gross; New York Journal of Commerce and Commercial Bulletin.

[27] Per ton of 2,240 pounds, at mills; Pittsburgh. Bulletin of the American Iron and Steel Association.

[14] to [22] Department of Labour of the Dominion of Canada, Wholesale Prices. Sources: Trade literature, esp., The Canadian Lumberman.

XXVI. Eastern spruce, rough dimension frames, 2″x10″ and 2″x12″, Boston.

XXVII. Lake States hemlock, dressed dimension, 2″x4″x16′, f. o. b. Wausau.

XXVIII. Southern yellow pine, No. 1 common, dressed boards, 1″x12″x12-16′, f. o. b. mills, Mo. to May, 1907; thereafter Tex. Base prices, respectively, $13.91 and $12.37.

XXIX. Southern yellow pine, No. 1 dressed dimension, 2″x4″x14-16′, f. o. b. mills, Mo. to May, 1907; thereafter Tex. Base prices, respectively, $11.18 and $10.78.

XXX. White and red oak, plain sawed, firsts and seconds, rough, 1″, Chicago.

XXXI. White pine, C selects, dressed, 1″x10″x10-16′, Minneapolis.

XXXII. White pine, No. 1 common, dressed, 1″x12″x16′, Minneapolis.

The figure heading each column is the base price of the item, being the average monthly price for the period, 1901 *to* 1903.

V. LETTER: CONDITIONS OF LUMBER MANUFACTURE IN THE UNITED STATES.

The only records that are immediately available to me are those of the * * * and we have been operating for only about five years. During these five years all of our supplies have increased in cost—for instance, we were buying beef at 5½c per pound in 1909 and we have paid as high as 12c per pound for the same quality this year. Wages have also advanced during these five years about 15%; taxes have about doubled, from which you would conclude that our lumber costs us more now than five years ago. This, however, is not the case—because these items which have tended to increase the cost of manufacturing lumber have been offset by other items which have decreased the cost—these items are as follows: Improvements in our machinery and our organization that have increased the cut of the mill; improvements in our methods of logging and development along other lines that has reduced our overhead or general expense.

When we began sawing in our mill we ran with about 600 boiler horse power capacity. We later installed a chemical plant and a wood mill for manufacturing chemical wood, which increased our boiler capacity to over 1600 horse power, and instead of burning our waste refuse in a refuse burner we are now using all our refuse for fuel. In our woods operation we are paying more attention to pulp wood of various kinds, cutting our cedar closer and taking all of the hardwood cord wood for the chemical plant so that our logging railroad now has about three times the daily tonnage that it did early in our operation.

I have looked over the cost accounts of the * * * however, which go back for more than thirty years. These records show a marked decrease in costs, as you go back, and my impression is that about the maximum in cost of production was reached in 1908.

My theory as to lumber values is that the average level of the year 1913 represents a normal condition in the industry. I do not believe that we will get back to the 1913 average this year or next year, and I believe that the average level of prices for the next ten years will not exceed the level of prices for the past five. This does not mean that the individual woods—for instance, Gum and Birch—may not advance to a higher level for the reason that they are substitutes for still higher priced hardwoods. Maple will advance markedly as the available supply diminishes—it is now being sold at less than it is intrinsicly [*sic*] worth, but lumber as a building material, in competition with brick, cement and steel, and as a crating and boxing material in competition with fibre, cannot look for advanced prices.

The investigations which you make will bring a great deal of light on this subject and I am glad the work is being undertaken. I believe that your investigations will bring out this one central fact of the lumber industry. During the two decades prior to 1910 the advance in lumber values has been greater than the advance in the cost of production and this difference has been absorbed by the stumpage. The advance in stumpage value has been sufficient to absorb the reasonable interest on the investment in timber and the taxes and other carrying charges. During the present decade, however, lumber values have been stationary; they have not increased; they have simply fluctuated with the fluctuating prosperity. The result of this is that stumpage values have remained stationary also. This is true in Wisconsin and Upper Michigan, and while I am not directly familiar with other parts of the country, I believe it is more or less true all over the United States, with the exception of some specific kinds of wood for which a special market has been developed.

Granting the truth of the above paragraph, you see a very grave problem of re-adjustment now confronts the lumber industry. For years the lumber operator has been going on cutting timber and manufacturing it into lumber, and making a narrow margin of profit on the operation. Year by year the taxes on his timber have been increasing and its carrying charges accumulating and the increased value of the timber has made good for it. Now—if he must re-cast his figures and place the burden of carrying his timber each year on that year's operation, the cost of his *stumpage cut* is doubled.

* * *

Finally—because I have spoken plainly my views of the lumber situation you must not conclude that I am pessimistic. I believe that the future of the lumber industry is brighter than any other of our great industries. We still have an abundance of timber; the uses of lumber have not been developed and exploited and advertised as have the uses of other commodities; the manufacture of lumber has never been systematized or standardized as have other industries; we have no recognized uniform systems of accounting; no recognized standards of cost of production. It is true that there have [*sic*] been marked development in the mechanical side of the industry, but all of the processes are still wasteful of material and more wasteful of human energy. The trained scientist is working in his laboratory; the trained forester is working in the field; the expert accountant is getting into the office; the efficiency engineer will soon be getting into the mill; enlightened methods of advertising are being adopted by the lumber associations. I even hope that the lumber industry will so develop in all these ways as to be able to produce and sell lumber at a lower range of prices than in the past.

Just at the present time the lumber industry, like many others, is in the stress of the storm, but the present situation, in its full acuteness, is I trust but temporary.

The letter from which these excerpts have been taken was written in November, 1914, *by a prominent lumber manufacturer in the Great Lakes region. The name of the company is withheld by request.*